App. F. IX—4

Previous References.

1945-46 (Elect-)

File No. 207-45

Serial Nos. 1, 2, 3, 4, 5, 7, 8 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, ~~24 to 26~~ 27, 28

Later References.

MYSORE GOVERNMENT SECRETARIAT

Serial Nos.

Part B for

SUBJECT

Construction of a Transmission line from Bhadravati to Bangalore.

WD 0142—GPB—50,000—10-6-57

G.O.No. EDS 237-239/Ele-207-45-27 dt 24th July 1946

The Chief Engr. & Electrical Engineer
The Comptroller to Govt.
The Auditor, Electrical Dept.

construction of a Transmission line fr... Bhadravathi to Bangalore.

Continuation Sheet. File No. Current No. 2246 Elect of Page.

1 Letter No. 33364 dated the 29th May 1940 from the Chief Electrical Engineer.

Forwards for sanction an estimate for Rs. 95.68 lakhs for the above works.

The cost of the work is proposed to be met from the list of post-war schemes for which administrative sanction has already been given in November 1945.

2 The C & R also requests sanction to

a) carrying out the works departmentally

b) entertain the necessary construction and maintenance establishments as provided in the estimate

c) the grant of construction allowance to the staff

d) the purchase of the necessary materials required for the works through S.P.C.

3 It may be stated here that the grant of construction allowance has been considered as inadvisible and the provision made therefor will therefore have to be deleted.

4 The matter is a schedule one. Submitted for orders.

5/6) The estimate may be sanctioned debiting the Provision of 10% Const. Allowance

Secy) IBJ 5/6

Construction of Transmission Line from Bhadravathi to Bangalore

C. F. 69.

Continuation Sheet. File No. Current No. 207 of 43 2206 Page.

5) The estt of Rs 98.68 lakhs is for constn of a Transmn Line from Bhadravathi to B'lore. The work is included under the 100 lakhs scheme admin vetd and the C.E. is now submitting a detailed estt for the work. The cost of the terminal equipments both at B'lore & Bhadravathi has also been included. The work is proposed to be done departmentally, which may be agreed to. The estt may be sanctioned which may be sanctioned with the deletion of the constn allowance. The estt may be sanctioned & case key (1)n.

Figure 98.68 lakhs revised to 98.65 lakhs as per C.E.'s letter. KW/25/6/46

Min P.W. / Dewan / Fin Secy. KW/3/6/46

6) ~~Miscellaneous~~

7) The quarters at Bangalore may also be deleted.

8) With reference to the cost as passed by the Auditor may be approved

B 30/6

9) KW/2/7/46. KW/2/7

10) KW/3/7/46

11) KW/3/7/46 KW/3/7

12) If the quarters at Bangalore

PUBLIC WORKS DEPARTMENT U.O. 8254 4/6

F.W.D. Secretariat U.O. 876 Principal Engr. P.W.D. may be invited. KW/8/6

Secretariat to issue on 20-6-46

FINANCIAL SECRETARIAT U.O.No. Fl..... 8776 25/6/46 BANGALORE

55

DEWAN'S OFFICE 4 JUL 1946 NO 127

Construction of Transmission lines from Bhadravathi to Bangalore.

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are meant for the operating staff of the "new station", they cannot will be deleted. The "new station" will be located in the Industrial Estate and there are no houses in the neighbourhood which the members of the staff could get for rent.

13) I presume that Sir Henry Howard was consulted about the general design of the equipment during one of his visits of inspection

7/7/46.

C.E.R. W[illegible] 14) KW 8/7/46.

15) A draft letter to the C.E.'s is sent herewith for approval.

Secy 16) 9/7

17) Issue KW 10/7/46

Issued in D.O. No. 83 dt. 10-7-46 to the C.E.R. requesting to be informed if Sir H. Howard was consulted in the matter.

Letter to M/s was issued vide D.O. dated 10-7-46 from the Secy. Electricity Engineer.

NOTE—Contn. Sheet.

Seria No.

25) A draft letter to the C.E. Tarapur of Bombay is put up for orders whether the E.E. may be requested to work out the details of the alternative scheme and also supply Mr. N.N. Iyengar with any information he may require in this connn. (Secy) 18/30/7

A plan & estn of the 77 type of towers may be asked to be sent to Mr. N.N. Iyengar. 18/30/7 No 30/7

18/30/46

26) Yes, taking the standard towers as used in the B'bay Tata Power Transmissions.

18/30/7/46

Ltr alld. by the Secy. for orders if it may be issued now.

18/8/46

Issued in D.O. No. BDS 329/Genl 207-45-4 dt 2-8-46 18/8/46.

To N. N. Iyengar, Esq., Bombay requesting him to furnish his opinion on the question.

18/8

Secy

5/8

C.E. letter No. 4287 dated the 5th August 1946 from the Chief Electrical Engineer.

States that the 'H' frames are already under fabrication and the manufacture is expected to be completed within the course of a month.

27) The C.E. requests to be intimated if the fabrication of the balance of

Construction of a Transmission line from Bhadravathi to Bangalore

Serial No.

1 2235 2021/Cacc

5/8

struction held in abeyance ...

28) submitted for orders ...

... above Engrs ... 5/8

... 25) As per Govt orders passed, Mr. N. N. Iyengar was directed for his opinion reg. ... of the H. structures of the towers and he was required to ask for any information he requires from the C.B.E. C.B.E. was sent a copy of the letter & requested to supply any information asked.

30) The C.B.E. in his letter dated 8/46, herewith put up, states that against 1258 'H' frames & 164 angle structures required for this Bangalore-Bhadravati Transmn Line, 615 'H' frames & 74 angle structures have been already ordered & are under manufacture. Most of the raw material is stated to have been procured. The manufacture is expected to be completed within a month. He was asked to delay the construction pending decision in consideration of the alternative suggested. C.E.E. asks for orders for the fabrication of the balance of structures kept in abeyance ...

31) The number of 'H' frames for which orders have been placed is a little less than 50% of those required (615 out of 1258) & out of 164 angle structures required, only 46% have orders placed for. Hence ...

NOTE—Contn. Sheet.

construction of a Transmission line from Bhadravati to Bangalore —

235 Elec 2

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The total cost as said is Rs lakhs and the cost of the balance of 'H' frames & angle structures for which orders are not yet placed, is about 50 lakhs, which is not a mean figure for outlay. I think, the present orders as placed by the C.E.E may go through & be completed but the balance may be taken up after deciding the question as per advice of Mr. N.N. Iyengar, whom received the orders for; the balance may therefore be asked not to be placed, in the meanwhile. The work is not so urgent and we could delay (Mr. P.W. Dewan) by a month or two for the decision, since perhaps a substantial saving of some lakhs may be achieved.

DEWAN'S OFFICE 13 AUG. 1946 No. 1124

OFFICE OF THE MINISTER FOR PUBLIC WORKS 6 AUG. 1946 No. 1035

Even the 'H' structures for which orders have been placed, could be utilised either as a whole or by dismemberment of the frames, as will be found feasible & economical for the other lines, particularly the Bhadravati — Davangere or lines of a less capacity than the 110.00 K.V.A line of Bhadravati — Bangalore. The other lines may require only single pole or 'H' structures & the verticals of the 'H' structures could be easily used for them. The Tata lines in Bombay are carry 110.00 K.V.A & are carried on towers, which may be spaced 1200 to even 2000 apart as a mean.

In case the use as proposed now is not feasible the proposal made supra may be made operative. The structures are not yet erected on the spot.

(Mr. P.W. Dewan)

Construction of a Transmission Line from Bhadravathi to Bangalore

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Serial No.

34) The balance of the orders need not be manufactured: A decision will be taken after the report of Mr. N. N. Iyengar is received.

14/8

35) Minr P.W. KW 15/8/46.

OFFICE OF THE MINISTER FOR PUBLIC WORKS 16 AUG. 1946 1332

36) Same instructions to the C.E.E. on the above lines immediately.

Ajit 15/8/46

37) Today KW 16/8/46.

38) Draft for a letter to the Bds. are put up for approval.

11/8/46 39) Done. 16/8

✓ Issued in SM. EDS 4442/Elect. 207-45-7 dated 16th Aug. 1946. To the Exes. directing to keep by the cut lengths and to hold the fabrication of the clearance of structures in abeyance

✓ letter dated the 13th instant 946 from Mr. N. Iyengar of Bombay.

S. 21

24

NOTE—Contn. Sheet.

Construction of a Transmission line from Bidarahalli to Bangalore

Serial No.

Letter dated the 4th Jan. 1946 from the C.E. Bangalore to the Secretary to Govt. Mysore in the P.W.D.

(i) The views of Mr. N.N. Iyengar are summarised in Note-page 7 ante submitted for orders.

25/9 25/9 Secy 27/9

(ii) Mr. N.N. Iyengar has sent his views regarding the question of the use of Steel Towers as against the 'H' Structures now being used by the C.E. The conclusions, for which solid reasons are given in the note, are

i) Long wooden poles if available are the best, in which the 'H' structures could be more economically used. But long poles are not available to the extent required & a more use of steel structures is indicated as a necessity.

(ii) The present prices indicate that for approximately the same costs the line could be built with self supporting wide based towers. It is desirable to consider the tower design for such an important long trunk transmission line as this (Bellary-Bhadravati line).

iii) In Mysore, it is unnecessary to use galvanised

551 Rev.

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Serial No.

OFFICE 7·10·46 C367

structures. Perhaps the pile or lower type may be tried in galvanised steel so the line "outages" could be reduced.

42) For the long + high transm" line with high voltage carriers, towers as recommended by Mr. Iyengar, with spans upto 1000 or even more

43) His recommendations may perhaps be approved + C.B.E asked to modify his structures to Towers.

[illegible]

44) An estimate for Towers as per prevailing rates in Mysore was got prepared by me and a comparative statement of cost per mile for this as against the 'H' structures now being used is put up. This is indicative of a saving of about Rs 9000 per mile. The lower alternative assumes a span of 1700 feet as against 700 only adopted for 'H' structures. The total savings, even assuming for safety, only the realisation of only half the savings, the total savings for the B'lore Bhadravati line would be Rs 10,35000 45) Even this is a high figure. The C.E.B. will be told to examine Mr. N.V. Iyengar's note + also the comparative estis put up and report. In any case, as opined by Mr. Iyengar even if the two cost the same, the lowers are to be preferred + be adopted

352 5×200×2/11 = 704

OFFICE OF THE MINISTER FOR AGRICULTURE AND PUBLIC WORKS 8 OCT, 1946 No. 2554

FINANCIAL SECRETARIAT U.O.No. FI 2407 1/10

48) Agree

8/10/46 Min P.W

Dewan

Fin Secy

47) A. agree

NOTE—Contn. Sheet

49) [illegible]

50) [illegible]

51) [illegible]

52) The draft letter to the CEE was not issued as a reply was since received.

53) Submitted for order.

54) Offering his views on the report of Mr D.V. Segrave the CEE takes the report to favour the use of the Stromberg particularly as it means utilising local materials only and that adoption of the latter design entailing considerable delays.

55) This is contrary to the note in para, 44 above.

WD 03814—GPE—[illegible]

Serial No.

56) The towers need not be manufactured in Calcutta but locally in Mysore and the high cost assumed in Mr. N. N. Iyer's note will go down considerably, as is seen from an estimate put up by me, which shows a saving of at least 1/3rd of cost as per the 'H' structures. Mr. Iyengar has though slightly costlier strongly advocated the lower design as per estimate put up here as against the 'H' structures. There is also no ground for the assumption by the C.E.E that Mr. N.N. Iyengar is agreeable to the use of the 'H' structures, as will be seen from paras 4 & 5 of the former's note. To summarise,

i) The 'H' structures are about 1/3 costlier than Towers, if & when local materials and fabrication are adopted instead of placing orders in Calcutta, which is far less costly.

ii) Mr. N. N. Iyengar is for Towers in spite of the slightly extra cost as per his estimate, vide paras 4 & 5 of his note and not for 'H' structures as assumed by C.E.E. in his note put up.

iii) If (i) is accepted, the total savings would be several lakhs.

57) The C.E.E. may be asked to examine the costs as per (i) above & submit a report to Govt for orders.

Min P.W.
&
Dewan
thro
Fin Secy

Rd/16/10 Rd/16/10 B/25/10 Rd/29/10 Rd/29/10

OFFICE OF THE MINISTER FOR PUBLIC WORKS
29 OCT 1946
3164

FINANCIAL SECRETARIAT
U.O.No. Fi 2745 17/10
BANGALORE

NOTE—Contn. Sheet

Serial No.

58) The rest [illegible]

59) I have examined Mr. N. N. Sirgar's proposals on the question of latticed steel pole supports Vs Steel Towers, and agree with him in that:

"If however the line could be constructed for approxly. the same costs with self-supporting steel towers, I would prefer the tower designs for an important trunk transmission line as this to transmit over a single circuit 50 cycle Power from Bheemasandra to Bangalore, a distance of 165 miles . . ."

60) From a comparative Statement of costs it will be seen that the cost of H-frame structures proposed by the C&R will be about the same as self-supporting towers. While H-frame structures are "flexible", the towers with angles can be designed to be self-supporting. With the latter, the total number of supports required will be fewer than those of H-frame which means fewer insulators, and therefore less chances of interruption to power service.

61) If we agree to adopt the Tower design, the question arises as to:-

(1) What to do with the 615 H-frames and 74 angle structures said to have been already fabricated?

(2) Can we get the necessary steel for

Serial No.

647
Secret

fabricating towers?

Re (1) & (2), I think that in view of our large requirements of transmission line supports for 66 KV. 32 miles, several line extensions as the line to Ujjani, the linking up of Davanagere with Tumkur (110 miles), a line between Mandya and Chennapatna (26 miles), etc. I notice from the drawings received from Mr. N.N. Sengar for the Towers proposed, that the heaviest angle iron required is 4"x 4"x 5/16" which, I understand, our Mysore Iron & Steel Works at Bhadravati can roll. Therefore, it should not be very difficult for to obtain the necessary steel for the 4-legged Towers.

A.

62) If the tower design is decided upon, the C.E. may be requested to proceed on the basis of the tower designs received from Mr. N.N. Sengar which were prepared by a famous firm of Consulting Engineers in New York, Messrs. Phoenix Engineering Corporation, and to utilize the H-frame structures already fabricated on other less important lines.

Min. P.W.) R.L. 11/11/46.

11/11

63) Regarding A above the Ag. C.M.M. & S.W. who was here yesterday said that he would go back to Bhadravati and write to you. He may be reminded

OFFICE OF THE MINISTER FOR AGRICULTURE AND PUBLIC WORKS
11 NOV. 1946
No. 3533

NOTE—Contn. Sheet

Serial No.

and copies of it is received that it may be given [illegible]

[illegible]

R.R. 13.x.46.

64) 15/11

The Ag. S.M. of the Iron & Steel Works may be reminded to send in his report re the feasibility of rolling 4"x4"x5/16". & 3½"x3½"x5/16" angles besides the usual lower size angles they are now rolling.

R.R. 16.xi.46.

65)

A direct letter to the [illegible] Manager is necessary [illegible]

16/11 16/11 Secy) 66) 17/11 67) Some R.R. 18/11/46

68)

A reminder to be sent [illegible] is [illegible]

19/11

has been received till to-day.

26/11 JGSmc
M
26/11

Issued in No. EDS 1884 dated 26th Nov. 46
To the Hg. General Manager, M.I.S.W.
reminding him in the matter ...

69) If no reply is recd. by 1st Dec., this may be brought up to me again, personally. No further delays can be allowed.

RR. 27.XI.

Express

70) A draft telegram is put up as personally instructed by the Secretary.

30/11 JM 30/11.

71) Issue. RR
30.XI.46

Confirmation letter issued in D.O. No. EDS 1914 Secl 207-45-13 dated 30th Nov. 1946.
To Mr. K. Narasimhan, Esq., Ag. Genl. Manager Mysore Iron and Steel Works, Bhadra.

72) File may be put up again on Tuesday next week.

RR. 30/XI/46.

RR/30/11

pt up on 3/12/46

JM 30/11

Letter No. 10445 dated the 30th Nov. 1946 from the Ag. General Manager Mysore Iron & Steel Works, Bhadra. Furnishes the information ...

73) Submitted for orders with reference to paras 63 and 64 of the notes above.

2/12 JM 2/12

Secy) RR 2/12

74) The Eng. General Manager & the Chief Engineer (Irrigation) should be asked to examine the Contractor's claim for the extra cost of the work due to the delay in the receipt of the steel from the Railways & advise whether the claim is admissible in part or in full. If so, they should also state the amount of the claim which is admissible & the reasons therefor.

75) Discussion with the Engineers. The Contractor's claim is for the steel received for the Tunnel Section. Will the Tunnel Section be completed in time by the Contractor, if the steel for the Tunnel Section is received in the same proportion as the steel for the other sections of the line?

76) Under the circumstances, it is not advisable to alter the alignment of the Railway line at this stage. The Railway Engineers should be asked to examine the feasibility of providing a temporary diversion of 66 kV line on the towers.

(Illegible)

Executive Engineer

A letter in this regard is being submitted separately for Dewan's approval.

Dewan: May be submitted to the Dewan

7/12/46

4031

Serial No.

81) A draft to C.E.E. may be put up.

R.L. 2/1/47.

82) A draft letter to the C.E.E. is put up for approval.

3/1/47 3/1

83) The draft is for approval. Sanction to the estimate for Rs 98,65,000 has to be considered now. Vide Paras 1 to 6 of note supra

Seen) 6/1

84) The letter to C.E.E. may be issued and the file put up for taking further action on the estimate.

R.L. 7.1.47

15 Memo. E. D. S. 1814 dated the 7th January 1947 To The C.E.E conveying approval to the fabrication of the remaining H-frame structures being completed and adding that the use of towers should be considered while designing future transmission lines of 66 KV and above

85) The file is resubmitted after issuing the letter to the C.E.E.

9/1/47 7/1 Seen) 7/1

86) On going through the estimate, I find that the following particulars have not been furnished by the C.E.E.:—

(1) Drawings showing the proposed outdoor terminal structure and ~~lay out of~~ the out-door switchyard

At what Stage is the Est for Rs 98,65,000. 4/1

This estimate is now the file & that has to be considered now. 6/1

NOTE—Contn. Sheet

Bhadravathi - Bangalore
Transmission Line.

1027
V 1262

design of the new type of fabricated towers & the total requirements.

9) Letter No. 19769 dated the 9th January 1947 from the Chief Electrical Engineer

Forwards the drawings required

88) submitted for orders with reference to para 87.

Secy) 89) 13/11/1

10/11/47 Gm 10/1

No. E 05. 195-1 dt 20-1-'47.
To The Genl Manager,
Mysore Iron & Steel works.
Bhadravathi.
Calls for a detailed report.

No. E 05. 1988 dt 23-1-'47
To The C. E. E.
Calls for additional info. & certain drawings.

Letter No. 21883 dt 29-1-47
from the C. E. E. furnishes info. & the drawings.

E. 05. 2112 dt 3-2-47
To The C. E. E.
Requests him to ascertain from the manufacturers the possibility of the secondary voltage of the main transformers being raised to 4600.

Gm 7/2/47

[illegible]

[illegible] dated the 7th [illegible]
1947 from the [illegible]

Provision for this work is to be made

raised.

90) Submitted for orders.

91) The estimate under consideration is for the construction of a single circuit, 110 KV., 50 cycles, Transmission Line from Bhadravati to Bangalore. Administrative Sanction to this work was conveyed in E.D.S. 1082-85 d 27.11.45 at an estimated cost of Rs 60 lakhs. The estimate (detailed) received from the C.E. amounts to Rs 98.65 lakhs.

92) A scrutiny of the estimate goes to show that certain economies can be effected as follows:-

1) The length of the line estimated should be 160 miles instead of 165 miles. This will result in a saving of Rs 1,40,000.

2) Some of the provisions made for labour are high, even after taking into account the present day costs of labour, etc.:- For instance, the following provisions in detailed estimate 'A' may be reduced:-

	Est. Cost.	may be Revised to:
(a) Labour charges for erection of Structures, etc.	Rs 100	Rs 75.
(b) Stringing of Conductors Per mile,	Rs 75	Rs 60
(c) Jungle-clearing, Per mile,	Rs. 400	Rs 300.

This will result in a saving of Rs 54,000.

3) Under detailed estimate 'E', item (9), a rate of Rs 400 per ton for erection of Low tension Switchgears is made. This ought to be Rs 200 per ton as in Est. (D) resulting in a saving of Rs. 14,000.

4) Labour charges for jungle clearing in connection

Serial No.

with surveys under estimate (C) should be Rs 100 per mile instead of Rs 100 per day for 8 months. This will result in a saving of Rs. 8,000. —

(5) The provision for buildings such as Staff quarters and the new receiving Station at Bangalore is for Rs. 9,04,000. Of this, Rs 3,00,000 is for a new receiving Station building, ~~at~~ but no details have been furnished. This may be sanctioned, Subject to the proviso that the work should be taken up only after a detailed estimate for the work is sanctioned by Government.

By certain re-adjustments in the matter of locating quarters for Transmission Line Staff, a saving of Rs 40,000 can be achieved under this item. Similarly, the quarters for ~~Bases~~ & labourers at Bhadravati may be omitted as this additional Staff is not necessary in view of the fact that a large contingent of staff was recently sanctioned for the Bhadravati Receiving Station. . . . . .

(6) I consider that the following reductions in the temporary construction establishment can be made:-

(a) 4 Transmission Line Inspectors would be adequate, instead of 6; as the period provided is 18 months.

(b) The number of Miscellaneous clerks may be reduced from 8 to 6

(c) Construction allowance of 10% may be allowed to the Transmission Line Inspectors only, as they will have to be constantly on the move

NOTE- Contn. Sheet

Construction of a transmission line ...

File No. 227 of 1945-46 | General and Revenue Secretariat

Ser. No. 1670 gbl

from place. Place in the usual manner.

7) Provision has been made for quarters for the Receiving Station staff amounting to a cost of Rs 2,21,500. This may be allowed as it is necessary, in the interest of the service, to accommodate the essential service staff near by the receiving station which will be located on the Nilgiri peak, far away from the city proper.

8) Against 5 Transmission Line Inspectors only for, 4 Inspectors may be sanctioned. By re-location of the line stations, 3 linemechanics, 12 linemen at intermediate stations may also be omitted.

93) With the above modifications, the estimate of the 3rd & 4th chain of the line gets reduced from Rs 98,65,500 to Rs 95,50,000, and may be sanctioned.

94) The operation & maintenance establishment which cost Rs 69,653 per annum as against Rs 78,344 proposed by the CEE. may also be sanctioned.

95) This is a schedule case, and may kindly be disposed of by circulation.

Rec'd. on Table on 15-4-47.

Min. Rly. & Defence. through H. Secy.

Rly. Ex. 94 9.4.47.

7119 15/4

1614

WD 05238—GPB—15,000—8-1-47

(Contd on next page)

...of a Tram line from Bhadravati to Bangalore.

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Serial No.

96) At present quarters are not provided for the Electrical Departmental staff employed at Bangalore. Any departure from this practice will lead to an inconvenient precedent and we will be making an invidious distinction between this staff and other departmental staff. Therefore the provision for residential quarters at Bangalore may be deleted.

97) In the case of other buildings, it is necessary to keep down the capital cost as the return on capital cost is worked out to be only 1½% as against 7% required by rules.

98) No construction allowance need be allowed.

99) With these modifications, and the modifications suggested by the Electrical Secretary, the estimate may be sanctioned.

22/4/47.

23/4

100) I am not sure if the economies suggested by the El Secy can be effected. We may however, try.

101) It is said the receiving station will be in Magadi road and without providing quarters to the maintenance staff nearby, it may not be possible to expect efficient service.

102) Construction allowance

NOTE- Contn. Sheet

No. 7119
OFFICE OF THE MINISTER FOR AGRICULTURE AND PUBLIC WORKS
24 MAR 1947
No. 8143

...sion of a Tram line from Bhadravati to Bangalore.

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Serial No.

No 7119 X

1570

OFFICE OF THE MINISTER FOR AGRICULTURE AND PUBLIC WORKS
24 MAR 1947
No. 8143

96) At present quarters are not provided for the Electrical Departmental staff employed at Bangalore. Any departure from this practice will lead to an inconvenient precedent and we will be making an invidious distinction between this staff and other departmental staff. Therefore the provision for residential quarters at Bangalore may be deleted.

97) In the case of other buildings, it is necessary to keep down the capital cost as the return on capital cost is worked out to be only 1½% as against 7% required by rules.

98) No construction allowance need be allowed.

99) With these modifications, and the modifications suggested by the Electrical Secretary, the estimate may be sanctioned.

22/4/47.

23/4

23.4.47

100) I am not sure if the economies suggested by the El Secy can be effected. We may however try.

101) It is said the receiving station will be in Magadi road and without providing quarters to the maintenance staff nearby, it may not be possible to expect efficient service.

102) Construction allowance

NOTE- Contn. Sheet

Serial No. 8143

in the case of staff coming in out & the way places is allowed. provision made in the estimates that account may remain. The estimate may be sanctioned. This is a commit. matter.

Secy.

Circulate

Hill 29/4

10) 5-5-47

RL. 7.5.47

10b) The file will be sent to the Financial Branch as required by the Financial Secretary.

4/5 4/5/47.

Secy)

10c) H. Secy (W/C) RL. 12/5/47

El. Secy W/C) 14/5/47.

11a) D.C.N. maybe put up early.

RL. 15/5

11) A draft circulation note is put up for approval.

12) 17/5/47

13) Fair type.

RL. 17/5

17.5.47

15.5.47

7886 13/5

WD 5298—GPB—15,000—8-1-47

Construction of a Transmission line from Bisalpur (Ajmer) to Banskhoh

App. F. III-2

General and Revenue Secretariat

1670 Genl File No. 207 of 1945.

Serial No.

1164) A typed draft copy of the circulation note is put up.

KBC 31/5/47

Secy)

For approval

Min. PWD)

RL. KBC 2/6 2/6/47

RR. 5/6 KBC 5/6/47

3/6

Copies of the above note are sent for favour of circulation and comments to Chief Engr.

KBC 6.6.47

Secy)

For favour of circulation.

Chief Secy. W/C)

RL. 14/6 KBC 14.6.47

OFFICE OF THE MINISTER FOR AGRICULTURE AND PUBLIC WORKS
3 JUNE 1947
No. 9291

Council File No. 1280.
FOR DISPOSAL BY CIRCULATION.
KBC 6/6/47

16/6/47

Views of the Ministers are placed below

Secretary to Government
Engr. Dept.
with compliments
26/6/47

20/6

XXX

D.F.R. to Chief Engr.

RL. 27.6.47 KBC 27.6.47

NOTE-- Contn. Sheet

NWD

NOTE FOR CIRCULATION IN COUNCIL.

Subject:- Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1946 the Chief Electrical Engineer has submitted for sanction an estimate ~~for~~ amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alteration have been made in the estimate under the various heads shown as hereunder:-

(1) Lbour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for Transmission Line Staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment.

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.50 lakhs.

a copy of the Director outline as suggested by the Department and so modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Hon'ble Member have agreed to the above proposals and have ordered that the matter may be disposed by circulation. The concurrence of the other Ministers of Council is requested.

Secretary to Government.
Electrical Department.

NOTE FOR CIRCULATION IN COUNCIL.

Council File No. 1260
FOR DISPOSAL BY CIRCULATION
O/C WP
16/6

Subject:- Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1946 the Chief Electrical Engineer has submitted for sanction an estimate amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alterations have been made in the estimate under the various heads shown as hereunder:-

(1) Labour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for Transmission Line staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment.

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.50 lakhs.

cop/

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Dewan have agreed to the above proposals and have ordered that the matter may be disposed of by circulation. The concurrence of the other Ministers of Council is requested.

R. Ramalingam.
Secretary to Government.
Electrical Department.
14.6.41

...NMENT OF MYSORE. ELECTRICAL DEPARTMENT.

Abstract estimate for constructing a 110 K.V. 50 cycles, single circuit transmission line from Bhadravati to Bangalore and the terminal structures at Bhadravati and Bangalore and the New Station at Bangalore

Sl. No.	Details of estimate	Estimate No.	Estimate amount as sent by the C.E.E.	Estimate amount as corrected in this office.
			Rs	Rs
1.	160 miles, 110 K.V. 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	46,02,000	44,80,000
2.	160 miles, Magneto Telephone line from Bhadravati to Bangalore	B	6,54,000	5,63,000
3.	Surveying the transmission line route	C	34,100	24,210
4.	Out-door terminal structure and control gear at Bhadravati.	D	1,75,200	1,75,200
5.	Out-door terminal structure, control gear, metalclad switchgear, transformers etc., at Bangalore.	E	16,03,400	15,84,420
6.	Four river crossing structures	F	25,200	25,200
7.	Six special structure for Hilly areas.	G	28,700	28,700
8.	Six transposition structures	H	30,900	30,110
9.	Six sectionalising structures	I	60,500	58,600
10.	Three Railway guarding structures	J	4,100	4,100
11.	Buildings for Receiving Station at Bangalore, quarters for Laintenance Staff at Bangalore, Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	9,04,000	8,48,500
12.	Construction Establishment with allowances.	L	83,100	167,171
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 K.V. distribution system	M	15,51,000	15,51,000
14.	Five protective equipment at the Bangalore Reciving Station (estimated)	N.	80,000	80,000
15.	Travelling allowances etc.		8,000	8,000
16.	Medicines for temporary staff		2,000	2.000
17.	Contingencies and for rounding		18,800	19,789
		Total	Rs 98,65,000	95.50.000
		Annual cost of Maintenance	78,344	69,653

RR. 14/7/07

Secy. to Govt. Elec. Deptt.

Council File No. 1280
FOR DISPOSAL BY CIRCULATION
Min. for Edn
P. H.
17/6

OFFICE OF THE MINISTER FOR EDUCATION, C. P. & B.
Date. 17/6
No. 76 55

17/6/47

NOTE FOR CIRCULATION IN COUNCIL.

Subject:- Estimate for the construction of a transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1940 the Chief Electrical Engineer has submitted for sanction an estimate amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 60 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alterations have been made in the estimate under the various heads shown as hereunder:-

(1) Labour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for transmission line staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment.

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.60 lakhs.

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Deputy have agreed to the above proposals and have ordered that the matter may be disposed of by circulation. The concurrence of the other Ministers of Council is requested.

R. Ramalingham
Secretary to Government,
Electrical Department.
46/47.

KP/

Abstract estimate for constructing a 110 K.V. 50 cycles, single circuit transmission line from Bhadravati to Bangalore and the terminal structures at Bhadravati and Bangalore and the New Station at Bangalore

S. No.	Details of estimate	Estimate No.	Estimate amount as sent by the C.S.E.	Estimate amount as corrected in this office.
			Rs	Rs
1.	160 miles, 110 K.V. 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	46,02,000	44,00,000
2.	160 miles, Magneto Telephone line from Bhadravati to Bangalore	B	6,84,000	5,63,000
3.	Surveying the transmission line route	C	34,100	24,210
4.	Out-door terminal structure and control gear at Bhadravati.	D	1,75,200	1,75,200
5.	Out-door terminal structure, control gear, metal clad switchgear, transformers etc., at Bangalore.	E	16,03,400	15,84,420
6.	Four river crossing structures	F	25,200	25,200
7.	Six special structures for Hilly areas.	G	28,700	28,700
8.	Six transposition structures	H	30,900	30,110
9.	Six sectionalising structures	I	60,500	58,600
10.	Three Railway guarding structures	J	4.100	4.100
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance staff at Bangalore, Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	9,04,000	8,48,500
12.	Construction Establishment with allowances.	L	83,100	67,171
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 K.V. distribution system	M	15,51,000	15,51,000
14.	Five protective equipment at the Bangalore Receiving Station (estimated)	N.	30,000	30,000
15.	Travelling allowances etc.		8,000	8,000
16.	Medicines for temporary staff		2,000	2,000
17.	Contingencies and for rounding		18,800	19,730
		Total	Rs 98,65,000	95,50,000
		Annual cost of Maintenance	78,344	69,653

RL 14/6/07

Secy. to Govt. Elec. Deptt.

Council File No. 1280
FOR DISPOSAL BY CIRCULATION
Min for Law..
16/6
24/6/47.
OFFICE OF THE MINISTER FOR LAW
25
No. 8547

NOTE FOR CIRCULATION IN COUNCIL.

Subject:- Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1946 the Chief Electrical Engineer has submitted for sanction an estimate amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alterations have been made in the estimate under the various heads shown as hereunder:-

(1) Labour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for Transmission Line staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment.

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.50 lakhs.

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Dewan have agreed to the above proposals and have ordered that the matter may be disposed of by circulation. The concurrence of the other Ministers of Council is requested.

R Ramakrishna.
Secretary to Government,
Electrical Department.
14/6/47

GOVERNMENT OF MYSORE. ELECTRICAL BRANCH

Abstract estimate for constructing a 110 K.V. 50 cycles, sin[gle] circuit transmission line from Bhadravati to Bangalore and the ter[minal] structures at Bhadravati and Bangalore and the New Station at Beng[alore]

Sl. No.	Details of estimate	Estimate No.	Estimate amount as sent by the C.E.E.	Estimate amount as corrected this off[ice]
			Rs	Rs
1.	100 miles, 110 K.V. 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	45,02,000	44,00,
2.	100 miles, Duplex Telephone line from Bhadravati to Bangalore	B	6,54,000	5,03
3.	Surveying the transmission line route	C	34,100	24
4.	Out-door terminal structure and control gear at Bhadravati.	D	1,75,200	1,75
5.	Out-door terminal structure, control gear, metalled switchgear, transformers etc., at Bangalore.	E	16,03,400	15
6.	Four river crossing structures	F	25,200	
7.	Six special structures for hilly areas.	G	23,700	
8.	Six transposition structures	H	30,900	
9.	Six sectionalising structures	I	60,500	
10.	Three Railway guarding structures	J	4,100	
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance Staff at Bangalore, Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	9,04,000	
12.	Construction Establishment with allowances.	L	83,100	
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 K.V. distribution system	M	15,51,000	
14.	Five protective equipment at the Bangalore Receiving Station (estimated)	N.	30,000	
15.	Travelling allowances etc.		8,000	
16.	Medicines for temporary staff		2,000	
17.	Contingencies and for rounding		18,300	
		Total	Rs 93,65,000	
	Annual cost of Maintenance		73,344	

146/W

Secy. to Govt.

Council File No. 1280
FOR DISPOSAL BY CIRCULATION
Minister Agri + Public Works.
16/6
17/6
OFFICE OF THE MINISTER FOR AGRICULTURE AND PUBLIC WORKS
18 JUNE 1947
No. 542

NOTE FOR CIRCULATION IN COUNCIL.

Subject:- Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1946 the Chief Electrical Engineer has submitted for sanction an estimate amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alterations have been made in the estimate under the various heads shown as hereunder:-

(1) Labour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for transmission line staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment.

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.50 lakhs.

Copy

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Deputy have agreed to the above proposals and have ordered that the matter may be disposed of by circulation. The concurrence of the other Ministers of Council is requested.

R.Ramakrishna.
Secretary to Government,
Electrical Department.
14/6/47.

GOVERNMENT OF MYSORE. Electrical Branch.

Abstract estimate for constructing a 110 K.V. 50 cycles, single circuit transmission line from Bhadravati to Bangalore and the termina structures at Bhadravati and Bangalore and the New Station at Bangalore

Sl. No.	Details of estimate	Estimate No.	Estimate amount as sent by the C.E.	Estimate amount as corrected in this office.
			Rs.	Rs.
1.	160 miles, 110 K.V. 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	46,02,000	44,30,000
2.	160 miles, Magneto Telephone line from Bhadravati to Bangalore	B	6,54,000	6,03,000
3.	Surveying the transmission line route	C	34,100	24,210
4.	Out-door terminal structure and control gear at Bhadravati.	D	1,75,200	1,75,200
5.	Out-door terminal structure, control gear, metalclad switchgear, transformers etc., at Bangalore.	E	16,03,400	15,84,420
6.	Four river crossing structures	F	25,200	25,200
7.	Six special structures for Hilly areas.	G	23,700	23,700
8.	Six transposition structures	H	30,900	30,110
9.	Six sectionalising structures	I	60,500	53,500
10.	Three Railway guarding structures	J	4,100	4,100
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance staff at Bangalore, Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	9,04,000	8,48,000
12.	Construction Establishment with allowances.	L	83,100	67,171
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 K.V. distribution system.	M	15,51,000	15,51,000
14.	Give protective equipment at the Bangalore Receiving Station (estimated)	N.	30,000	60,000
15.	Travelling allowances etc.		8,000	8,000
16.	Medicines for Temporary staff		2,000	2,000
17.	Contingencies and for rounding		18,800	19,799
		Total	Rs 98,65,000	95,50,000
	Annual cost of Maintenance		78,344	69,653

RR-1474

Secy. to Govt. Elec. Deptt.

NOTE FOR CIRCULATION IN COUNCIL.

Council File No. 1280
FOR DISPOSAL BY CIRCULATION
Min for Home) WOB 15/6/46

T.N. 506
17/6

Subject:- Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1946 the Chief Electrical Engineer has submitted for sanction an estimate amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alterations have been made in the estimate under the various heads shown as hereunder:-

(1) Labour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for transmission line staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment.

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.50 lakhs

copy

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Dewan have agreed to the above proposals and have ordered that the matter may be disposed of by circulation. The concurrence of the other Ministers of Council is requested.

R Ramakrishnan

Secretary to Government,
Electrical Department.

14.6.47

GOVERNMENT OF MYSORE. [illegible]

Abstract estimate for constructing a 110 K.V. 50 cycles, single circuit transmission line from Bhadravati to Bangalore and the terminal structures at Bhadravati and Bangalore and the New Station at Bangalore

Sl. No.	Details of estimate	Estimate No.	Estimate amount as sent by the C.E.E.	Estimate amount as corrected in this office.
			Rs	Rs
1.	160 miles, 110 K.V. 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	46,02,000	44,60,000
2.	160 miles, Dagnete Telephone line from Bhadravati to Bangalore	B	6,54,000	6,63,000
3.	Surveying the transmission line route	C	34,100	24,210
4.	Out-door terminal structure and control gear at Bhadravati.	D	1,75,200	1,75,200
5.	Out-door terminal structure, control gear, Metaloid switchgear, transformers etc., at Bangalore.	E	16,03,400	15,84,420
6.	Four river crossing structures	F	25,200	25,200
7.	Six special structures for Hilly areas.	G	28,700	28,700
8.	Six transposition structures	H	30,900	30,110
9.	Six sectionalising structures	I	60,500	58,600
10.	Three Railway guarding structures	J	4,100	4,100
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance Staff at Bangalore, Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	9,04,000	8,48,500
12.	Construction Establishment with allowances.	L	83,100	67,171
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 K.V. distribution system	M	15,51,000	15,51,000
14.	Five protective equipment at the Bangalore Receiving Station (estimated)	N.	80,000	80,000
15.	Travelling allowances etc.		8,000	8,000
16.	Medicines for temporary staff		2,000	2,000
17.	Contingencies and for rounding		16,800	19,709
		Total	Rs 99,65,000	95,50,000
	Annual cost of Maintenance		78,344	69,652

RR: 14/6/47

Secy. to Govt. Elec. Deptt.

NOTE FOR CIRCULATION IN COUNCIL.

Council File No. 1280
FOR DISPOSAL BY CIRCULATION
Min for Rev & Commcan.
16/6

OFFICE OF THE MINISTER FOR REVENUE
No. 11124
Date 17.6.47

Movements
17/6

Subject:- Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 28th May 1946 the Chief Electrical Engineer has submitted for sanction an estimate amounting to Rs 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

2. Certain alterations have been made in the estimate under the various heads shown as hereunder:-

(1) Labour charges for erection, stringing and jungle clearing.

(2) In the matter of locating quarters for Transmission Line staff.

(3) In the construction establishment and the construction allowance.

(4) In the maintenance establishment

With the above modifications the estimate is reduced from Rs 98.65 lakhs to Rs 95.50 lakhs.

copy

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

The Minister for Agriculture and Public Works and the Dewan have agreed to the above proposals and have ordered that the matter may be disposed of by circulation. The concurrence of the other Ministers of Council is requested.

R. Ramakrishna
Secretary to Government,
Electrical Department.
14.6.45

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

Abstract estimate for constructing a 110 K.V. 50 cycles, single circuit transmission line from Bhadravati to Bangalore and the terminal structures at Bhadravati and Bangalore and the New Station at Bangalore

Sl. No.	Details of estimate	Estimate No.	Estimate amount as sent by the C.S.E.	Estimate amount as corrected in this office.
			Rs	Rs
1.	160 miles, 110 K.V. 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	46,02,000	44,80,000
2.	160 miles, Magneto Telephone line from Bhadravati to Bangalore	B	6,54,000	5,63,000
3.	Surveying the transmission line route	C	34,100	24,210
4.	Out-door terminal structure and control gear at Bhadravati.	D	1,75,200	1,75,200
5.	Out-door terminal structure, control gear, metalcled switchgear, transformers etc., at Bangalore.	E	16,03,400	15,84,420
6.	Four river crossing structures	F	25,200	25,200
7.	Six special structures for Hilly areas.	G	28,700	28,700
8.	Six transposition structures	H	30,900	30,110
9.	Six sectionalising structures	I	60,500	58,600
10.	Three Railway guarding structures	J	4,100	4,100
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance Staff at Bangalore, Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	9,04,000	8,48,500
12.	Construction Establishment with allowances.	L	83,100	67,171
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 K.V. distribution system	M	15,51,000	15,51,000
14.	Give protective equipment at the Bangalore Reciving Station (estimated)	N.	80,000	80,000
15.	Travelling allowances etc.		8,000	8,000
16.	Medicines for temporary staff		2,000	2,000
17.	Contingencies and for rounding		18,800	19,739
		Total	Rs 98,65,000	95,50,000
	Annual cost of Maintenance		78,344	69,653

14/6/10

Secy. to Govt. Elec. Deptt.

Final Note by the Minister for Agriculture and Public Works.

Subject.— Estimate for the construction of a Transmission Line from Bhadravati to Bangalore.

With his letter dated the 25th May 1946, the Chief Electrical Engineer has submitted for sanction an estimate amounting to - Rs. 98.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore. The length of this line will be about 160 miles.

Certain alterations have been made in the estimate under the various heads shown as hereunder:-

1. Labour charges for erection, stringing and jungle clearing.
2. In the matter of locating quarters for transmission line staff.
3. In the Construction Establishment and the Construction Allowance
4. In the Maintenance Establishment.

With the above modifications, the estimate is reduced from Rs. 98.65 lakhs to Rs. 95.50 lakhs.

A copy of the abstract estimate as proposed by the Chief Electrical Engineer and as modified in the Secretariat is enclosed herewith for reference.

B and para 03 of Note

The other Ministers of Council and the Dewan have agreed to the proposal. I solicit the gracious sanction of His Highness thereto.

Bangalore,
2nd July 1947.

K. Siddappa
Minister for Agriculture
and Public Works.

Submitted to His Highness.

I submit herewith a Final Note by the Minister for Agriculture and Public Works on the proposal to sanction an estimate for Rs.95.50 lakhs for the construction of a Transmission line from Bhadravati to Bangalore, for the gracious sanction of His Highness.

A Ramaswami Mudaliar

DEWAN.

Bangalore,
4th July 1947.

Record of Cases submitted for the Orders of His Highness the Maharaja.

Subject.

Estimate for Rs.95.50 lakhs for the construction of a Transmission line from Bhadravati to Bangalore.

No. 34

Order.

KRN.
8/7/'47.

15/7/47

General and Revenue Secretariat.

1670 Elec

WD 06911—GPB—1000—3-7-47

Issue & Circulate.
RR.
16/7/47
16.7.47

SUBJECT:—

Estimate for Rs.95.50 lakhs for the construction of a Transmission line from Bhadravati to Bangalore.

Circulated to Council of Ministers for perusal of His Highness' orders before/after issue of orders.

Narayan Rao
Chief Secretary to Government.
16/7/47

Through the Secretary to Government,

Electrical and Railway Department.s

1. Minister for Education and Public Health. **Seen.**

691 2. Minister for Law. 21/8/47.

882 29/7/47 3. Minister for Agriculture and Public Works.

4.7.8 5.7.47 4. Minister for Home. 21/8/47

1335 21/8/47 5. Minister for Revenue and Communications.

Secretary to Government,
Elec & Ry: Departments
(with compliments)

NOTE.—Contn. sheet

RR 5/8 for 5.8.47

Continuation Sheet. 1670 Estimate for constructing a 110 K.V. single circuit transmission from Bhadravati to Bangalore

File No. 207 of 1945-46. Page.

Current No.

Submitted with a draft G.O. for approval.

17/7/47

17.7.47

Seen

Done RR. 21.7.47

21.7.47

Issues a G.O. in EDD No. 237-239/EL207-45-47 dated the 24/7/47 to

(1) The C.E.E. (with a copy of the estimate)

(2) The Comptroller to Govt.

(3) The Budget. Elect. Dept (with a copy of the estimate)

Sanctions an estimate for Rs 95.50 lakhs including of one, Rs 98.65/- lakhs as proposed by the C.E.E. ~~vide Letter No. 2595 dated 19/7/47~~ for the construction of a Transmission Line between Bhadravati & Bangalore with necessary terminal equipments at B'lore & Bhadravati. ~~Further C.E.E's~~ approves of the proposals (1) to carry out the work departmentally (2) entertain the necessary construction & maintenance establishment & (3) grant the C.E. the staff & (4) to purchase the necessary materials through Spc. ~~are also approved.~~

The file will now be sent to C.B. for completing circulation.

25/7/47

25.7.47

Seen

For favour of circulation.

Chief Secy. W/C

RR 29/7/47

29.7.47

Elect 207 45-1.

TELEPHONE NO. 2110.

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

IN REPLY REFER NO. 3330344, ENCLO. Estimate in Triplicate Report in Duplicate Drg in Duplicate.

OFFICE OF THE CHIEF ELECTRICAL ENGINEER

TELEGRAPHIC ADDRESS: "GOMED"

Bangalore 25th March 19 46.
(MYSORE, S. INDIA)

CODES USED
BENTLEY'S LIEBER'S
A. B. C. 6TH EDITION
BUSINESS TELEGRAPH CODE.

2296
31-5-1946

The Secretary to Government,
Electrical Department,
Bangalore.

Sir,

Construction of a Transmission line from Bhadravati to Bangalore.

Ele/30/5/46
H/30/5

I have the honour to invite your kind reference to Govt. Order No. EDS. 1082-85 dated 27th November '45 communicating administrative sanction of Government to the Scheme as enumerated in the accompanying estimate for 500 Lakhs and to forward herewith an estimate amounting to Rs. ~~95,68,000~~ 98,65,000/- for the construction of a Transmission line from Bhadravati to Bangalore with necessary terminal equipments both at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cy. station with the existing stations in Bangalore and request you to obtain and communicate sanction of Government therefor.

The cost of this estimate is to be met from the provision of 60 Lakhs under Item (2) and 17 Lakhs under Item (7) and 20 Lakhs under Item (10) in the statement accompanying the Government Order referred to above.

The need for the construction of this line and the installation of the equipment has been explained in detail in the Memorandum that was forwarded to Government with my letter No. 29253 dated 24th May '45, a copy of which is herewith enclosed.

The report accompanying the estimate explains in detail the necessity for the various provisions made and the estimate provides for the most economical and safe execution of the Project.

While communicating sanction of Government to the estimate, sanction may also be obtained and communicated for executing the

work departmentally, for entertainment of necessary construction and maintenance establishment as provided for in the estimate, also for the construction allowances proposed and also for the purchase of the materials required for the work through the -- Secretary, Stores Purchase Committee.

As necessary action has to be taken and purchase of the materials arranged for servicing of the transmission line, very early sanction of Government may kindly be obtained and communicated.

I have the honour to be,
S i r,
Your most obedient servant,

Chief Electrical Engineer. 29/5

Audit remarks enclosed.

REPORT TO ACCOMPANY THE ESTIMATE FOR TRANSMISSION OF 50 CYCLE POWER FROM BHADRAVATI TO BANGALORE INCLUDING A 110 K.V. TRANSMISSION LINE TERMINAL STRUCTURE, STEP DOWN TRANSFORMERS, H.T & L. T. SWITCHGEAR, ETC.

The estimate herewith submitted for Rs. ~~95,04,000/-~~ 98,65,000/- Kw is for the purpose of interconnecting the C.P.S. 25 cycles and the 50 cycles Jog Power systems at Bangalore and for making available in the Bangalore area 50 cycle power from the Jog power scheme as planned in items 2, 7 & 10 of Postwar Electrical Power expansion projects, sanctioned in G.O.S. No. 1082-85 dated 27-11-1945, items 2, 7 & 10, vide this Office letter No. 29918 dated the 18th April 1945. The technical justification for the project has been detailed in a Memorandum (Copy enclosed) sent with this Office letter No. 29258 dated the 24th May 1945 to the Secretary, Electrical Department.

The abstract estimate together with attached drawing gives a picture of the project as a whole. To transmit 15000 K.V.A. power to the South Eastern Part of the State, terminal Stations will have to be erected at Bhadravati and Bangalore, (Estimates "D" & "E") and a transmission line of about 160 miles at 110 K.V., 3-phase, 50 cycles will have to be constructed (Estimate "A") between the above mentioned places. For communication purposes, 2 telephone circuits are proposed to be constructed to run in parallel with the transmission line, one for direct connection between Jog, Bhadravati & Bangalore, for station operation and the other for interstation and line maintenance purposes (Estimate "B"). Estimates "F", "G", "H", "I" and "J" provide for special hilly areas structures, River crossing structures, Railway crossing structures and structures for sectionalising of the line as will be essential for operation and Maintenance.

Estimates "D" & "E" indicate details of outdoor structures together with transformers, H.T. & L.T. switchgear, Arresters, isolators, etc., required at Bhadravati and Bangalore -

Bangalore respectively. Provision has been made for L. T. switchgear for (1) interconnection of the New and "A" - - Stations (2) for distribution of 4400-volt, 50 and 25 cycle power to various feeder circuits in the City & C & M. Station areas including the several large Textile Mills and Industrial concerns.

Estimate "K" gives details of the various buildings required under the Project, such as the New Receiving Station at Bangalore, Quarters for the transmission Line Staff to be stationed enroute and also for the Colony to be established for the operating Staff, etc., near the New Receiving Station Site in the Industrial Suburb. Further details of the buildings are given in the annexure to this estimate. Provision is also made in this estimate for a 50 ton crane necessary for easy handling of the heavy transformers, Breakers, Frequency Changer, etc., and for Fire protective Equipment.

Estimate "L" indicates the additional construction Staff necessary for carrying out the heavy construction programme involved and estimate "M" shows the proposed work for the installation of new underground interconnecting cables between the new 50 cycles Receiving Station and the existing "A", "B" & "C" Stations. These underground cables instead of overhead interconnecting feeders will minimise interruptions now frequently occurring on the overhead system and give better service to the entire Bangalore system.

Estimate "N" indicates the annual cost of the Maintenance Staff required for satisfactory operation of the Project.

MH-KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

UTILISATION OF POWER GENERATED AT JOG.

Immediately after two machines are installed at Jog, the generation of power at Sivasamudram and Shimsha will have to be curtailed and limited to what can be generated by the use of 900 cusecs of water, which is the quantity to be let down in the river in accordance with the Agreement with the Madras Government. The amount of water thus made available can be distributed as follows:-

300 Cusecs for Shimsha
600 " for Sivasamudram.

The power generated will be as follows:-

300 cusecs at Shimsha will produce 17,200 K. W. at 75% load factor.

600 cusecs at Sivasamudram will produce 22,800 K. W. at 75% load factor.

Thus the total power that can be generated is 40,000 K. W.

The load on the two stations before the breakdown at Sivasamudram was 53,000 K.W. Since the additional installations have been serviced and if unrestricted supply is made available, the peak load is expected to be 55,000 K. W. when normal power of 15,500 K.W. is resumed by the Kolar Gold Fields. Thus the balance of power to be made available from Jog Station for meeting the existing demands is 15,000 K.W. Allowing for a normal growth of 1000 K.W. per year, during the course of next 5 years, the total demand to be met from the Jog Power Station in the existing distribution system throughout the State will be 20,000 K. W. (15,000 + 5000). Out of this about 5000 K.W. that is now being fed from C.P.S. system to the Bhadravati and Davangere areas will have to be deducted. Thus a net quantity of power to the extent of 15,000 K.W. will have to be transported from Bhadravati South-eastwards.

There is at present 1-78 K.V. line between Bhadravati and Mysore. This transmission line cannot be converted into a 110 K.V. line without complete remodelling, as the size of conductor and the type of poles do not permit of this modification. A second transmission line between Mysore and Bhadravati is under construc-

construction, which has a capacity of 10,000 K.W. Therefore - for transporting the balance of power of 5000 K. W. as well as power required for catering any additional loads like the proposed Cotton Mill at Nanjungud, etc., a second transmission line between Bhadravati and Bangalore or Mysore is required. Apart from this, a single transmission line between two power stations of large capacity does not guarantee 100% satisfactory service. Therefore duplicate transmission line is essential.

The question whether the second transmission line 110 K.V. should be between Bangalore and Bhadravati or between Mysore and Bhadravati has been examined. It is to be said that if frequency conversion is to be carried out expeditiously and easily, a line between Bangalore & Bhadravati is very necessary. Further two - transmission lines linking two systems should as far as possible be run in two different directions, so that any damage due to - causes beyond our control, such as heavy storms in particular - areas, may affect only a single transmission line and thus not isolate two systems, which is likely to happen, if both the - transmission lines are run through the same area.

In view of the above, it is considered very desirable that a second transmission line linking the two systems be run between Bangalore and Bhadravati, incidentally passing through Arsikere and other areas where prospects of future loads is - bright.

Accordingly while preparing the projects for the future transmission lines in the postwar development programmee, provision has been made for running a transmission line between - - Bangalore and Bhadravati. This new line with the line under construction between Mysore and Bhadravati will form a duplicate - link between the two systems, viz., 50 cycles and 25 cycles, and also serve to transmit load to the extent of 15,000 K.W. plus future loads towards South-eastern part of the States from Jog, thus reducing the output from Sivasamudram and Shimsha to what can be produced by the 900 cusecs of water allowable in the river under the contract with the Madras Government.

The importance of limiting the discharge from K. R. S. to 900 cusecs is obvious, in view of the special difficulties that are being experienced during the summer season and also for - extending the irrigation under the Irwin Canal area to the required acreage under the agreement.

From the figures of load furnished above, it will be kindly noticed that before 1950, 15,000 K.W. apart from the future unforeseen growth, has to be transported to the South-eastern part of the State. Therefore the line between Bangalore and Bhadravati will have to be completed well before that ~~xxxx~~ time. If this work is to be completed well before that date, necessary construction will have to start in 1948, if not earlier and necessary orders for the terminal equipment have to be immediately placed to be made available sometime in the - year 1948. If the transmission line construction work is to commence in 1948, the steel required for fabrication of steel structure for this transmission line will have to be obtained during the year 1947 and application for release of this steel has to be sent up immediately, if steel is to be obtained - during 1946, as a large quantity of steel cannot be expected to be released by the Controlling Authorities in a short period. Therefore, in the list of equipment approved to be purchased in the second para of EDS. No. 2553 dated 7-2-1945, terminal equipment required for the transmission line between Bangalore and Bhadravati are included. Specifications for this equipment are being prepared and will be issued in due course.

Thus it will be kindly seen that the next transmission line to be constructed. apart from the two additional transmission lines required for transmission of additional - power generated at Jog to Bhadravati, will be the Bangalore-Bhadravati Transmission Line.

"Copy"

Chief Electrical Engineer.

JS.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

Abstract estimate for constructing a 110 KV, 50 Cycles, single circuit transmission line from Bhadravati to Bangalore and the terminal structures at Bhadravati and Bangalore and the New Station at Bangalore.

Sl No.	Details of estimate	Estimate No.	Amount Rs.
1.	165 (160) Miles, 110 KV, 3 Phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	44,80,000 46,02,000/-
2.	165 (160) miles, Magneto Telephone line from Bhadravathi to Bangalore.	B	5,63,[illegible] 6,54,000/-
3.	Surveying the transmission line route.	C	24,710 34,100/-
4.	Out-door terminal structure and control gear at Bhadravathi	D	1,75,200/- ✓
5.	Out-door terminal structure, control gear, metalclad switchgear, transformers, etc., at Bangalore.	E	15,80,492 16,03,400/-
6.	Four River crossing structures.	F	25,200/- ✓
7.	Six special structures for Hilly areas.	G	28,700/- ✓
8.	Six transportation structures,	H	30,110 ✓ 30,900/-
9.	Six sectionalising structures.	I	58,600 60,500/-
10.	Three Railway guarding structures.	J	4,100/- ✓
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance staff at Bangalore, Bhadravati and for transmission line staff & also for installation of a 50 ton crane at Bangalore.	K	8,48,500 9,04,000/-
12.	Construction Establishment with allowances.	L	67,171 (83,100/-
13.	Cost of interconnecting the New Station with 'A', 'B' and 'C' Stations with underground cables and converting existing 2.2 K.V. to 4.4 KV distribution system.	M	15,51,000/-
14.	Five protective equipment at the Bangalore Receiving Station (estimated).	[illegible]	80,000/-
15.	Travelling allowances etc.,		8,000/-
16.	Medicines for temporary staff.		2,000/-
17.	Contingencies & for rounding.		(18,800/- 19,789
	Total Rs.		98,65,000/-

Annual cost of Maintenance Rs.78,344/-

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KM:GS

4.	132 kilos, 110 kV, 3 phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	45,22,222/-
5.	166 miles, Magneto Telephone line from Bhadravathi to Bangalore.	B	6,54,000/-
6.	Surveying the transmission line route.	C	34,100/-
7.	Out-door terminal structure and control Gear at Bhadravathi	D	1,75,200/-
8.	Out-door terminal structure, control Gear, metalled switchGear, transformers,etc., at Bangalore.	E	16,03,400/-
9.	Four River crossing structures.	F	25,200/-
10.	Six special structures for Hilly areas.	G	28,700/-
11.	Six transportation structures,	H	30,300/-
12.	Six ecotional[illegible] structures.	I	60,500/-
13.	Three Tallur[illegible] structures.	J	4,100/-
14.	[illegible] for Bangalore, [illegible] for Chamundi Railway at Bangalore [illegible] 50 ton crane [illegible]	K	6,06,000/-
15.	[illegible]	L	33,100/-
16.	[illegible] 4 KV Electric [illegible]	M	15,51,000/-
17.	[illegible]	N	80,000/-
18.	[illegible]		8,000/-
19.	[illegible]		2,000/-
20.	[illegible]		18,800/-
21.	Contingencies [illegible]		
	Total Rs.		98,65,000/-

[illegible]

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "A"

for constructing a 110 K.V., 50 cycles, single circuit transmission line from Bhadravati to Bangalore. Distance 165 (160) miles, 17 spans for 2 miles cost per two miles.

Sl No	Names of materials etc.	Unit	Quantity	Rate	Amount
1.	Fabricated steel suspension structures including braces, grillage, crossarms, etc.	No	15	1210-0-0	18150-0-0
2.	-do- strain structure inclusive as above.	"	2	1960-0-0	3920-0-0
3.	Suspension insulators, 7 units for suspension and 8 units for strain including loop supports.	"	459	9-0-0	4131-0-0
4.	334,600 C.M. A.C.S.R. cable or equivalent copper.	Mile	6	2100-0-0	12600-0-0
5.	Suspension clamps, with arcing horns, clevis fittings, etc.	set	51	22-0-0	1122-0-0
6.	Overhead steel ground wire, 5/16" dia.	Mile	4	500-0-0	2000-0-0
7.	Strain clamps with arcing horns, clevis fittings, etc.	set	12	25-0-0	300-0-0
8.	Strain clamps for overhead ground wire.	"	8	20-0-0	160-0-0
9.	Paint two coats for structures & cross-arms.	str.	17	25-0-0	425-0-0
10	Guy sets complete erected.	sets.	35	75-0-0	2625-0-0
11	Provision for grounding the earth wire with a clamp for testing purposes.	No	2	35-0-0	70-0-0
12	Miscellaneous materials, such as bird buards, joints, name plates, etc.	L.S.			400-0-0
13	Tools & Plant.	L.S.			600-0-0
14.	Cement concrete footings erected (about 112 C.ft).	No.	36	100-0-0	3600-0-0
15.	Labour charges for assembly and erection of structures including digging pits, painting etc.	No.	17	100-0-0	1700-0-0
16	Labour charges for stringing power & ground wires, fixing insulators, etc.	Mile	10	75-0-0	750-0-0
17	Jungle clearing for transmission & ~~telephone~~ line.	L.S.			400-0-0
18	Transportation charges	L.S.			600-0-0
19	Stock incidentals @ 6¼% on items 1-14				3125-0-0
			Total	Rs.	56678-0-0

Cost per mile Rs. 28339/-
Cost for 165 (160) miles Rs. 4601685 or say 4602000/-

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GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "B"

for constructing a double circuit magneto telephone line from Bhadravati to Bangalore, (165 miles) (cost per mile).

Sl No	Names of materials etc.	Unit	Quantity	Rate	Amount
1.	Ascu treated baliga pole 26'	No.	24	20-0-0	480-0-0
2.	4-pin crossarm with braces.	"	26	6-0-0	156-0-0
3.	No. 6 B & S or 8 S.W.G.H.D.B.C. copper wire.	Mile	4	350-0-0	1400-0-0
4.	8 K.V. pin insulators	No	104	4-6-0	455-0-0
5.	Guy sets erected.	"	6	45-0-0	270-0-0
6.	Miscellaneous materials such as binding wire, solder, paint etc.	L.S.			30-0-0
7.	Labour charges for erection of poles crossarms, braces, fixing insulators and stringing conductors.	Mile	1	220-0-0	220-0-0
8.	Jungle clearing.	Mile	1	50-0-0	50-0-0
9.	Transportation charges	L.S.			50-0-0
10	Stock incidentals @ 25% on item 1 and @ 6¼% on items 2 to 6				265-0-0
				Total Rs.	3376-0-0
	Total for 165 miles 160 miles			Rs.	(631290-0-0)
11	Wall Telephones with arresters, insulating transformers, D.P.S.T. switch teakwood board, extension bell.	No.	16	400-0-0	6400-0-0
12	Portable telephones with leads etc.	"	32	300-0-0	9600-0-0
13	Primary cutouts for sectionalising the line.	"	24	37-8-0	900-0-0
14	River corssing structures with necessary 2 B & S.A.C.S.R. wire erected.	sets	4	825-0-0	3300-0-0
15	Railway guarding structures, etected.	sets	3	500-0-0	1500-0-0
16	Stock incidentals on items 10,11,12.				1056-0-0
				Total Rs.	654046-0-0
				or say Rs.	654000/-

RR 8/1/47

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6.	8 H.P. Petrol Engine.	No.	1	£25-0-0
7.	Duty paid.	"	8	£5-0-0
8.	Miscellaneous materials such as binding wire, solder, paint etc.	L.S.		30-0-0
9.	Labour charges for erection of pole crossarms, braces, fixing insulators and stringing conductors. Mile		1	220-0-0
8.	Trestle clearing.	Line	1	30-0-0
9.	Transportation charges	L.S.		30-0-0
10	Stock Incidentals @ 5% on item 1 and @ 8½% on items 2 to 8			286-0-0
	Total			3376-0-0
	Total for 1 E			£3376-0-0
11	Wall Telephones with arrest [illegible] switch transformers, [illegible] ation terminal board, [illegible].	No.	16	400-0-0
12	Portable telephones with leads etc.	"	2	[illegible]
	[illegible] outputs for sectionalising line.			[illegible]
	[illegible] erecting structures [illegible] Nos 2 3 & 5 A.C.B.D. [illegible] complete.			3500-0-0
	[illegible] mounting structures [illegible]			1500-0-0
	[illegible] items 1 [illegible]			1096-0-0
	[illegible]			6840+6-0

or say £6840\-

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "C"

Estimate for surveying the route of the proposed transmission line between Bhadravati & Bangalore.

Sl No.	Particulars.		Amount.
1.	Depreciation on Surveying Instruments.	L.S.	Rs. 1000-0-0
2.	Tools & Plant.	"	Rs. 4000-0-0
3.	Pay & allowances for two Overseers or Inspectors @ Rs.80-5-125 + C.A. Rs. 24/- for 8 months. Average salary = Rs. 108/- C.A. & H.A = Rs. (24/- + 30/-) 1x8x2		Rs. 2112-0-0
4.	Labour charges for clearing jungle, etc., during surveys, demarcations, etc., @ Rs. 100/- per day for 8 months. mile		Rs. 24000-0-0
5.	Drawing instruments & Stationery.		Rs. 500-0-0
6.	Miscellaneous materials such as flags, Keresene, etc.		Rs. 1500-0-0
7.	Transportation charges for Camps, survey materials, Tools, etc.		Rs. 1000-0-0
		Total	Rs. 34112-0-0

Or Say Rs. 34,100/-

K.-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E"

ESTIMATE FOR CONSTRUCTING AN OUTDOOR TERMINAL STRUCTURE & CONTROL GEAR AT BANGALORE.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	Terminal & transformer structure complete with buses, conductors, indulators, platforms, etc., as per detailed estimate "E" item 1.	No.	1	80,000. 85000-0-0	80,000 85000-0-0
2.	110 KV, 3-phase lightning arrester & isolators as per detailed estimate "E" item 2.	Set.	1	19300-0-0	19300-0-0
3.	Oil circuit breakers 110 KV. outdoor type with operating mechanism etc., complete as per detailed estimate "E" item 3.	No.	3		223200-0-0
4.	Control panels for line transformer bank H.T. & L.T. complete. Detailed estimate "E" item 4.	No.	3		65500-0-0 ~~44400-0-0~~
5.	Power transformers O.I.S.C. 15000 K.V.A. with O.L. tap changegear, etc., & also 250 K.V.A. station transformers. Detailed estimate "E" item 5.	No.	2		526700-0-0
6.	Oil circuit breaker L.T. 4.4 KV. outdoor type with operating mechanism, oil complete detailed estimate "E" - item 6.	No.	2		181600-0-0
7.	Cost of earthing both indoor and outdoor structures.			Estimated.	7500-0-0
8.	One 60 cell 800 ampere hour battery with battery chargers, etc., Detailed Estimate "E" - item 7.	Set.	1		34000-0-0
9.	Metalclad switchgear for L. T. distribution with buses, A.C.S. isolators, panels, meters, relay, switches, etc., Estimate "E" item 8.	No.	17		345300-0-0
10.	Miscellaneous materials such as insulated cables, control cables, bushings, etc.			Estimated.	27000-0-0
10 (a)	Tools & Plant.			L. S.	10000-0-0
11.	Erection charges as per estimate "E" item 9.				57000-0-0
12.	Transportation charges.			Estimated.	9000-0-0
13.	Stock incidentals @ 6¼% on item 10 & 10(a)				2320-0-0
	Or Say Rs. ~~14,47,500/-~~ 1603400/-			Total Rs.	~~1447420-0-0~~ 1603420-0-0

CHIEF ELECTRICAL ENGINEER.

KM-JS.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "I"

ESTIMATE FOR SECTIONALISING STRUCTURE.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Fabricated steel strain structure with crossarms, braces, gallage, etc.	No.	1	1960-0-0	1960-0-0
2.	26' ascu treated baliga poles.	No.	8	20-0-0	160-0-0
3.	I section with bolts, etc., for supporting the sectionalising switches.	Ton.	0.605	320-0-0	215-0-0
4.	Group operated, 3-phase, sectionalising switches with operating mechanism complete.	No.	1	3228-0-0	3228-0-0
5.	Pedestal insulators 110 K.V.	"	8	35-0-0	280-0-0
6.	Suspension insulators.	"	72	9-0-0	648-0-0
7.	Suspension clamps with arcing horns, clevis fittings, etc.	"	3	22-0-0	66-0-0
8.	Strain clamps with arcing horns, clevis fittings, etc.	"	6	25-0-0	150-0-0
9.	Strain clamps for overhead ground wire.	"	4	20-0-0	80-0-0
10.	Guy sets complete erected.	Set.	2	75-0-0	150-0-0
11.	Miscellaneous materials such as bird-guards, joints, 2 coats paint, etc.			L. S.	400-0-0
12.	Cement concrete footings for steel structure.	No.	3	100-0-0	300-0-0
13.	-do- for baliga poles.	"	x 8 nos.	40-0-0	320-0-0
14.	Labour charges for erection of structure, painting, etc.			L. S.	800-0-0
15.	Transportation charges.			L. S.	800-0-0
16.	Stock incidentals @ 25% on baliga poles, & 6% on items 1 & 3-13.				527-0-0
				Total Rs.	10084-0-0

Cost per structure = Rs. 10,084/- 9.764

Cost for 6 structures = Rs. 60,504/- or Say Rs. 60,500/-
58,584 58,600

K.-JB.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "H"

ESTIMATE FOR 6 TRANSPOSITION STRUCTURES - DRG. T. 275.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	Fabricated steel strain structures including braces, crossarms, gallage, etc.,	No.	1	1960-0-0	1960-0-0
2.	45' ascu treated baliga poles.	"	2	80-0-0	160-0-0
3.	Suspension insulators.	"	88	9-0-0	792-0-0
4.	Suspension clamps, arcing horns with clevis fittings, etc.,	Set.	3	22-0-0	66-0-0
5.	Strain clamps, arcing horns with clevis fittings,	Set.	8	25-0-0	200-0-0
6.	Strain clamps for ground wire.	No.	4	20-0-0	80-0-0
7.	Bird guards with bolts & Nuts, etc.	"	3	3-0-0	9-0-0
8.	Guy sets erected.	Set.	4	75-0-0	300-0-0
9.	Miscellaneous materials, paint, grounding materials, etc.			L. S.	350-0-0
10.	Cement concrete footings for structures.	No.	3	100-0-0	300-0-0
11.	-do- for Baliga poles.	"	2	60-0-0 → omit	120-0-0
12.	Labour charges for erection of structures.			L. S.	300-0-0
13.	Transportation charges.			L. S.	200-0-0
14.	Stock incidentals @ 6¼% on items 1,3-11 & @ 25% on item 2.				301-0-0
				Total Rs.	5138-0-0 / 5018-0-0

Total for one structure = Rs. 5,138/- (5018) R. 30,110

Total for 6 structures = Rs. 30,828/- (30,108) or Say Rs. 30,900/-

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E" ITEM 9.

Detailed estimate for the cost of erection of the H.T. & L. T. Switchgear.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Erection of 2/15000 K.V.A. & 250 K.V.A. transformers.	Ton	100	200-0-0	20000-0-0
2.	Transformer drying, testing and servicing.	No.	2	2000-0-0	4000-0-0
3.	Erection of switchgear, H.T. & L.T. & metal clad, lightning arresters, isolators, disconnected switches, etc.	Ton.	70	200-0-0 ✓ / 400-0-0	14,000-0-0 / 28000-0-0
4.	Labour for laying, jointing of power & control cables.			Estimated.	15000-0-0
				Total Rs.	67000-0-0

Or Say Rs. 67,000/-

KM-JS.

Chief Electrical Engineer.

6.	Lighting for the bays.	"		2000-0-0
7.	Grounding materials. Omit. Provide under item 7 of Estt. E.	L. S.		5000-0-0
8.	Miscellaneous & unforeseen materials.	L. S.		5000-0-0
9.	Stock incidentals @ 6¼% on items 5 & 7.			938-0-0
			Total Rs.	67498-0-0

Or Say Rs. 80,000/- 80,000.

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K"

Sl No.	Particulars.	Amount.
1.	Receiving Station building at Bangalore to house metalclad switchgear, frequency converter, etc., complete with lighting, drainage, water supply, land, etc., (Estimated).	Rs. 3,00,000-0-0 ✓ Details Estimate required for.
2.	1-50 Ton travelling crane for the Bangalore Receiving Station complete as per estimate "K"- item 1.	Rs. 96,000-0-0 ✓
3.	Erection charges for crane, crane track, weight approximate 40 Tons @ Rs. 150/- per Ton.	Rs. 6,000-0-0
4.	Quarters for Maintenance Staff at Bhadravati-Bangalore including amenities, lighting, water supply, drainage, etc. Estimate "K" item 2....	Rs. 2,36,500-0-0 - ?
5.	Quarters for Transmission Line Staff including lighting, water supply, drainage, etc. Estimate "K" item 3.	Rs. 2,65,500-0-0 - ?
	Total	Rs. ~~9,0x,000-0-0~~ Rs. 9,04,000-0-0

Total Rs. 9,04,000/-

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K"-ITEM 2.

QUARTERS FOR MAINTENANCE STAFF AT BHADRAVATI & BANGALORE.

Sl No.	Particulars.	Drawing Number.	No.	Amount in rupees.
I.	AT BHADRAVATI.			
a)	Shiftmen.	S.N.P. 33	4	6500-0-0
b)	Labourers.	S.N.P. 33	4	6500-0-0
c)	Lighting, water supply, drainage, fencing, acquisition, etc. Sundry.			2500-0-0
			Total Rs.	15500-0-0
II.	AT BANGALORE.			
a)	Assistant Superintendent.	J.P.S. "B" Type.	1	13000-0-0
b)	Junior Engineer.	J.P.S. "B" type.	1	13000-0-0
c)	Operators.	J.P.S. "C" type.	4	36000-0-0
d)	Asst. Operators & Cable Inspr.	Type "G" 379	5	35000-0-0
e)	Mechanics & Cable Jointer.	"G" 473	4	14000-0-0
f)	Station Helpers & Linemen.	"G" 445 &"G" 449	42	70000-0-0
g)	Lighting, water supply, drainage, fencing, acquisition & amenities. Sundry.			40000-0-0
			Total Rs.	221000-0-0

Total Rs. 15,500-0-0

" Rs. 221,000-0-0

Grand total Rs. 2,36,500-0-0 Rs. 2,36,500/-

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K"- ITEM 3.

QUARTERS FOR TRANSMISSION LINE STAFF.

Sl No.	Particulars.	Drawing Number.	No.	Amount in rupees.
1.	BHADRAVATI.			
	a) Transmission Line Inspector.	G. 379.	1	7000-0-0
	b) Linemen & Labourers.	S.N.P.33	4	~~xxxxx-x-xx~~
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			6500-0-0
				2500-0-0
2.	TARIKERE.			
	a) Line mechanic.	G. 473	1	3500-0-0
	b) Line men.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing acquisition, etc.			3000-0-0
3.	BIRUR.			
	xa) Transmission Line Inspector.	G. 379	⊕ ×	7000-0-0
	b) Linemen.	G. 449	6	10000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3500-0-0
	@) Line mechanic	G 473		3,500-0-0
4.	LATHIGATTA.			
	a) Line mechanic.	G. 473	1	3500-0-0
	b) Linemen.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
5.	BANAVARA. Omit.			
	a) Line mechanic.	G. 473	1	3500-0-0
	b) Linemen.	G. 445.	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
6.	ARSIKERE.			
	a) Transmission Line Inspector.	G. 379	1	7000-0-0
	b) Linemen.	G. 449	6	10000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3500-0-0
7.	TIPTUR.			
	a) Assistant Superintendent of Lines.	J.P.S. "B" type.	1	13000-0-0
	b) Line Mechanics & Lorry Driver.	G. 473	2	7000- 0-0
	c) Linemen & Lorry Cleaner.	G. 449-	6	10000-0-0
	d) Lorry Shed.		1	3000-0-0
	e) Lighting, water supply, drainage, fencing, acquisition, etc.			4000-0-0
8.	TURUVEKERE.			
	a) Line mechanic.	G. 473	1	3500-0-0
	b) Linemen.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
			Total C.O.	~~xxxxx-x-xx~~
				152000-0-0

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K" ITEM 3(CONTD)

Sl No.	Particulars.	Drawing No. number.		Amount in Rupees.
		Total B. F.		~~1x2xxx-x-x~~ 152000-0-0
9.	TAISANDRA. Doderi.			
	a) Line Mechanic.	G. 473.	1	3500-0-0
	b) Linemen.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
10.	YEDIYUR.			
	a) Line Mechanic.	G. 473	1	3500-0-0
	b) Linemen	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
11.	KUNIGAL.			
	a) Transmission Line Inspector.	G. 379	1	7000-0-0
	b) Linemen.	G. 449	6	10000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3500-0-0
12.	MAGADI.			
	a) Line Mechanic.	G. 473	1	3500-0-0
	b) Linemen.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
13.	THIPPAGONDANHALLI.			
	a) Line Mechanic.	G. 473	1	3500-0-0
	b) Linemen.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			~~2000-0-0~~ 3000-0-0
	(a) Linemen		3	5,000-0-0 "
14.	Tavarekere.			
	a) Line Mechanic.	G. 473	1	3500-0-0
	b) Linemen.	G. 445	5	8000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3000-0-0
15.	BANGALORE.			
	a) Transmission Line Inspector.	G. 379	1	7000-0-0
	b) Linemen.	G. 449	6	10000-0-0
	c) Lighting, water supply, drainage, fencing, acquisition, etc.			3500-0-0
		Total Rs.		~~2xxxxxxxxx~~
	Total Rs. ~~2,72,000/-~~ 265,500/-	Total Rs.		265500-0-0

MM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "L"

ESTIMATE FOR CONSTRUCTION ESTABLISHMENT WITH 10% CONSTRUCTION ALLOWANCE.

Sl No.	Particulars.	No.	Average pay.	10% Con. allowance.	Period/ months.	Amount.
1.	Asst. Superintendent of lines on Rs. 200-20-300 + H. A. Rs. 30/-	1	266-2/3 +30	27/-	18	5826-0-0
2.	Transmission Line Inspectors on Rs. 125-10-175 + H.A.Rs.30/-	6	158-1/3 + 30	16/-	18	22068-0-0
3.	Store Keepers II. Class at Birur, Tiptur & Kunigal.	3	50/-	5	18	2970-0-0
4.	Accounts Clerk on Rs.40-3-70-5-100.	3	74/-	7	21	5103-0-0
5.	Typist on Rs. 30-3-45.	2	41¼	4	21	1900-0-0
6.	Miscellaneous Clerks on Rs. 30-3-45.	8	41¼	4	21	7600-0-0
7.	Time keepers on Rs.30-3-45	3	41¼	4	18	2444-0-0
8.	Peon on Rs. 11/-	3	11	1	18	648-0-0
					Total Rs.	48559-0-0

1.	Assistant Superintendent on Rs.200-20-300 + C.A. Rs. 35/-	1	266-2/3 +35	27/-	18	5916-0-0
2.	Foreman on Rs. 200-20-300.	1	266-2/3	27/-	18	5286-0-0
3.	Operators on Rs. 125-10-175.	2	158-1/3	16/-	18	6276-0-0
3a.	Line Inspector on Rs. 80-5-125 + C.A. Rs. 5/-	2	108/- + 5	11/-	18	4464-0-0
4.	Asst. Operators on Rs.35-5/2-80	2	62	6/-	18	2448-0-0
5.	Accounts Clerk on Rs-40-3-70-5-100.	3	74	7/-	21	5103-0-0
6.	Typist on Rs. 30-3-45.	2	41¼	4/-	21	1901-0-0
7.	Miscellaneous Clerks on Rs. 30-3-45.	2	41¼	4/-	21	1901-0-0
8.	Time keepers on Rs. 30-3-45.	1	41¼	4/-	18	815-0-0
9.	Peons on Rs. 11/-	2	11	1/-	18	432-0-0
					Total Rs.	34902-0-0

Total cost of Construction Establishment both for transmission line and Stations at Bhadravati and Bangalore = Rs.83,461/- or Say Rs. 83,500/- 83100/-

Chief Electrical Engineer.

KL-JS.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

II. MAINTENANCE ESTABLISHMENT AT BHADRAVATI AND BANGALORE.

Sl No.	Particulars.	Average cost Rs.	No.	Average pay per month.	Annual cost.
I.	Bhadravati.				
a)	Shiftmen in grade Rs. 20-1-30	26-1/9	4	104-4/9	1254-0-0
b)	Labourers in grade Rs. 20-1-25	23-1/3	4	93-1/3	1120-0-0
II.	Bangalore for Station.				
a)	Asst. Superintendent, grade Rs. 200-20-300 + C.A. Rs. 30/-	296-2/3	1	296-2/3	3560-0-0
b)	Junior Engineer Rs.200-20-300	266-2/3	1	266-2/3	3200-0-0
c)	Operators grade Rs.125-10-175	158-1/3	4	633-1/3	7600-0-0
d)	Asst. operators. Rs. 80-5-125	108	4	432	5184-0-0
e)	Mechanic grade Rs. 35-2-45.	41-2/3	2	83-1/3	1000-0-0
f)	Station Helpers Rs.20-1-30	26-1/9	12	313-1/3	3760-0-0
g)	Labourers II.Class.Rs.20-1-25	23-1/3	10	233-1/3	2800-0-0
h)	Labourers III.class. Rs.15-1-20	18-1/3	10	183-1/3	2200-0-0
III.	Bangalore for underground Cable maintenance.				
a)	Cable Inspector grade Rs.80-5-125 + C. A. Rs. 15/-	123	1	123	1476-0-0
b)	Cable Jointer. Rs. 45-3-75 + C.A. Rs. 2/-	63-1/3	2	126-2/3	1520-0-0
c)	Linemen. Rs. 20-1-30 (with C.A. of Rs. 2/- for 3 men.)	26-1/9	10	261-1/9 + 6 = 267-1/9	3205-0-0
					35505-0-0
				Total Rs.	37879-0-0
					35,505
	Total annual Maintenance cost			Rs. 40,465-0-0	31,948-0-0
				Rs. 37,879-0-0	35,505-0-0
	Grand total Rs.			Rs. 78,344-0-0	67,453-0-0

K.-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "N".

DETAILS OF MAINTENANCE STAFF- ANNUAL COST.

I. TRANSMISSION LINE MAINTENANCE STAFF.

Sl No.	Particulars.	Average cost. Rs.	No.	Average pay per month.	Annual amount.
a.	Bhadravati.				
1.	Transmission Line Inspector. Rs.80-5-125 + H.A. 30/-	138	1	138	1656-0-0
2.	Linemen Rs. 20-1-30.	26-1/9	2	52-2/9	627-0-0
3.	Linemen Rs. 20-1-25	23-1/3	2	46-2/3	560-0-0
b.	Tarikere.				
1.	Line Mechanic Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen. Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen. Rs. 20-1-25	23-1/3	3	70	840-0-0
c.	Birur.				
1.	Transmission Line Inspector - 80-5-125 + H.A. 30/-	138	1	138	1656-0-0
2.	Linemen. Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen Rs. 20-1-25	23-1/3	4	93-1/3	1120-0-0
	Line Mechanic 35-2-45	41 2/3	1	41 2/3	500-0-0
d.	Mathigatta.				
1.	Line Mechanic. Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen. Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen. Rs. 20-1-25	23-1/3	3	70	840-0-0
e.	Banavara.				
1.	Line Mechanic. Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen. Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen. Rs. 20-1-25	23-1/3	3	70	840-0-0
f.	Arsikere.				
1.	Transmission Line Inspector Rs. 80-5-125 + H.A. Rs. 30/-	138	1	138	1656-0-0
2.	Linemen Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen Rs. 20-1-25	23-1/3	4	93-1/3	1120-0-0
g.	Tiptur.				
1.	Asst. Superintendent of Lines Rs. 200-20-300 + H.A.Rs. 30/-	296-2/3	1	296-2/3	3560-0-0
2.	Line Mechanic Rs. 35-2-45.	41-2/3	1	41-2/3	500-0-0
3.	Linemen. Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
4.	Linemen. Rs. 20-1-25	23-1/3	3	70	840-0-0
5.	Lorry Driver. Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
6.	Lorry Cleaner. Rs. 20-1-25	23-1/3	1	23-1/3	280-0-0
h.	Turuvekere.				
1.	Line mechanic Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen. Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen. Rs. 20-1-25	23-1/3	3	70	840
				Total C.O.	Rs.23824-0-0

ESTIMATE "N" (CONTD)

Sl No.	Particulars.		Average cost Rs.	No.	Average pay per month.	Annual amount.
1(Contd)						
i. Maisandra.						
1.	Line Mechanic.	Rs. 35-2-45.	41-2/3	1	41-2/3	500-0-0
2.	Linemen	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen	Rs. 20-1-25	23-1/3	3	70	840-0-0
j. Yediyur.						
1.	Line Mechanic.	Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen.	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen.	Rs. 20-1-25	23-1/3	3	70	840-0-0
k. Kunigal.						
1.	Transmission Line Inspector Rs.80-5-125 + H.A.	Rs. 30/-	138	1	138	1656-0-0
2.	Linemen	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen.	Rs. 20-1-25	23-1/3	4	93-1/3	1120-0-0
l. Lagadi.						
1.	Line Mechanic.	Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen.	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen.	Rs. 20-1-25	23-1/3	3	70	840-0-0
m. Thippegondanhalli.						
1.	Line Mechanic.	Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen.	Rs. 20-1-25	23-1/3	3	70	840-0-0
n. Tavarakere.						
1.	Line Mechanic.	Rs. 35-2-45	41-2/3	1	41-2/3	500-0-0
2.	Linemen.	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen.	Rs. 20-1-25	23-1/3	3	46-2/3	840-0-0
o. Bangalore.						
1.	Transmission Line Inspector Rs.80-5-125 + H.A.	Rs. 30/-	138	1	138	1656-0-0
2.	Linemen.	Rs. 20-1-30	26-1/9	2	52-2/9	627-0-0
3.	Linemen	Rs. 20-1-25	23-1/3	4	93-1/3	1120-0-0
					Total Rs.	40465-0-0

Chief Electrical Engineer.

7095

Est.No.487

The Electrical Audit & Accounts Office,
Bangalore, the 21st June 1946

Auditor's Certificate.

Certified that there is a provision of 97 lakhs under Item Nos.2, 7 and 10 of the List of Projects accompanying G.O. No.EDS. 1082-85 dated 2-11-45, communicating Administrative approval to the Projects to be undertaken in the Post-war period estimated to cost five crores as against Rs.98,65,000/-, the value of the present estimate. The source from which the excess of Rs.1,65,000/- is proposed to be met, may be pointed out.

2. The head of account under which the estimate has to be sanctioned is "V - Post-war Projects - 38(A) New Installations and Electrification Projects" and necessary grant has to be provided for, for expenditure during the year 1946-47.

3. Item No.11 of the Abstract Estimate (a) Buildings — Estimate (K).

a) At present Quarters are not being provided for the Departmental staff employed at Bangalore and as such the present proposal of the Chief Electrical Engineer to provide quarters for the Staff to be employed at Bangalore, requires specific approval of Government as it involves a new principle and may act as a precedent.

b) As regards other buildings, the return on the Capital Cost is calculated to work out to only 1½ per cent as against 7 per cent required by rules. This return is bound to be still lower if payment of rent as ~~revised rent~~ per revised rules held in abeyance under report to Government are not given effect to.

In this connection, the view expressed by the Chief Electrical Engineer, namely, that the return on buildings should not be considered separately but that the return on the total Scheme has to be taken into consideration is not acceptable to audit as it contravenes the Financial Rule that the Capital Cost of a building to be constructed should be so regularised as the rental calculated under the rules should not exceed 10% of the salary of the employees who usually occupy it.

4. 10% Construction Allowance provided herein requires special sanction of Government.

D. Venkatramayya

AUDITOR, 21/6
Electrical Department.

The excess of Rs1,65,000/- will be met from the provision of Rs10,00,000/- under item No.6 of the statement accompanying this office letter No.30053 dated 1st May 1946.

Chief Electrical Engineer.

Appendix F. G.—1]

SUBJECT Construction of a Transmission Line from Bhadravathi to Bangalore

Section Elect
File No. 207—45.
Serial No. 2.

Diary No. of letter replied to 2296

No. E 25. 83 dt 10-7-46

General and Revenue Secretariat

( )

the 194 .

To. The Chief Electrical Engineer, Bangalore

Date of issue 10-7-'46

Sir,

Signed by

With reference to your letter No 33364 dated the 25th March 1946 on the above subject, I am directed to request to be informed as to whether Sir Henry Howard was not consulted during one of his visits of inspection about the general design of the equipment connected with the above.

I have etc.

List of enclosures

Copied by

Examined by

KN 10/7/46
Secretary to Govt
Electrical Dept
9/7

WD 0374—GPB—25,000—20-11-45

Elecl 207-45-3

TELEPHONE No. 2110.

IN REPLY REFER TO NO. 1446 ENCLO.

TELEGRAPHIC ADDRESS:
"GOMED"

CODES USED
BENTLEY'S LIEBER'S
A. B. C. 6TH EDITION
BUSINESS TELEGRAPH CODE.

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE CHIEF ELECTRICAL ENGINEER

Bangalore, 11th July 19 46.
(MYSORE, S. INDIA.)

SECRETARY TO GOVT. P. W. ELECTL & MYS

Rec'd 83 12.7.1946

The Secretary to Government,
Electrical Department, Bangalore.

Sir,

Construction of a Transmission Line from Bhadravati to Bangalore.

With reference to your letter No.EDS.83/Elecl./207-45-2 dated 10th July 1946 on the above subject, I have the honor to state that Sir Henry Howard has gone into the question in great detail, and in one of his visits ~~suggested~~ discussed the various arrangements proposed to be made in detail with me and he has furnished his opinion on the various items of Post-War Projects.

During his visits he not only examined the necessity for the various works referred to in the Rs.500-lakhs Scheme ~~and~~ but also - studied the general design and accepted the same. He has suggested in one of his Reports that the design of the Transmission line may be altered to that of large size Towers in place of the "H" Frames that are being adopted. As the suggested design is economical only in case of a duplicate Transmission Line on the single Tower, the proposed design is being examined for use while running the duplicate Transmission line between Bhadravati and Jog. For the Single Trans: Line proposed to be run between Bangalore and Bhadravati the design that has been in use in the Department is an appropriate one and therefore has been adopted.

I have the honor to be,
Sir,
Your most obedient servant,

Chief Electrical Engineer. 11/7

MH-Alnr.

D.O.No.E.D.S. 329 / Copy of estimate & a report.
207—45—4 Elec. dated 2nd August 46

D R A F T.

Dear Sir,

I am desired to state that the Chief Electrical Engineer to Government has forwarded for sanction an estimate for Rs 98,65,000/- for the construction of a Transmission Line to transmit 50 cycle power from Bhadravati to Bangalore including a 110 K.V. Transmission Line Terminal Structure, step-down Transformers, H.T and L.T. Switchgear etc.

The Chief Electrical Engineer has adopted the "H" Type of structures to carry the 110 K.V. power lines as against the Tower Type with a greater height but larger spans as suggested be me and also by Sir Henry Howard in his note on tariffs.

There is a certain economical span, considering the less number of towers as against their greater height and on working out approximate figures it is found that the total cost per mile works out to about two thirds the cost with the "H" structure alternative involving smaller spans. The Towers due to the larger span will save in the number of supports per mile and also the insulators necessary. On the other hand the height of the supports will have to be greater as the sag will be greater. A most economical span has to be worked out and with your experience here and in Bombay, Government feel that you are best suited to give an authoritative opinion and a suitable design and estimate for the towers which may kindly be done.

I am therefore to request you kindly to favour this Government with your opinion on this question. A copy of the estimate along with the report accompanying it is forwarded for your information. The Chief Electrical Engineer is being requested to furnish you any details of information you may require in this matter.

Yours sincerely,

KW/18/46

To

N. N. Iyengar, Esq.,
Bombay.

Memo No.EDS. 330 Dated 2nd August 1946.

Copy of the above is forwarded, with compliments, to the Chief Electrical Engineer for information with the request that a copy of the plan and estimate of "H" Type structures may kindly be forwarded to Mr. N. N. Iyengar and any further information required by him in this connection may ~~kindly~~ be furnished.

Details of the alternative scheme may be worked out taking the standard towers as used by Tatas in their Power Transmission Lines at Bombay. Actual work on construction of structures may be delayed pending decision on this question.

B.O.

KW/18/46

Secretary to Government,
Electrical Department.

31/7

Elec 207-4-5-5. 2

Telegrams:-"GOMED"

MR. M. HAYATH. B.E. (MECH.), B.S.E.E.,
~~SUPERINTENDING~~
Chief Electrical Engineer.

D. O. No. 4287

Confidential

Telephone No. {OFFICE: 2416
RESIDENCE: 2014
Chief Electrical Engineer,
OFFICE OF THE ~~GENERAL SUPERINTENDENT~~
CAUVERY POWER SCHEME.

BANGALORE, 5th Aug 1946
(S. INDIA)

Dear Mr. Joshi,

Subject:- Construction of a Transmission Line from Bhadravati to Bangalore.

With reference to your Memo No.EDS.330 dated the 2nd instant, forwarding a copy of the D.O.letter addressed to Mr.N.N.Iengar, Bombay, I wish to inform you that against 1238 H-frames and 165 angle structures required for this transmission line, as per estimate, 615 H-frames and 74 angle structures have been ordered and are under manufacture. Most of the raw material has been given and the manufacture is expected to be completed with in the course of a month.

= 689 Structures

Raw material required for the fabrication of the balance of 91 angle structures and 623 H-frames has also been ordered and most of it cut to the required length has been delivered to the Superintendant, Power and Lighting, Bhadravati, by the Mysore Iron and Steel Works. It is for orders of Government if these cut lengths, as delivered, be kept by and the fabrication of the balance of structures be held in abeyance.

Yours sincerely,

M. Hayath
3/8

Work to proceed quickly.
KJ 8/46

K.D. Joshi, Esq., M.A., B.E., etc.,
Secretary to the Govt. of Mysore,
Electrical Department,
BANGALORE.

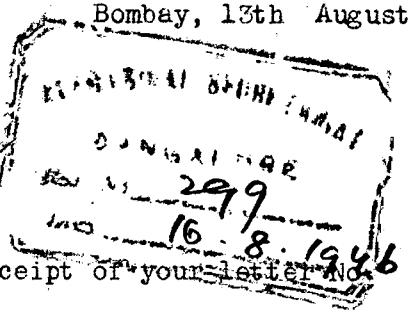
MH-CSC.

ELECTRICAL DEPARTMENT
BANGALORE.
Rec'd No. 235
Date 5/8/1946

N. N. IENGAR

C/o The Tata Power Co.Ltd
Bombay House, Fort,
Bombay, 13th August 1946

Elec 2 sept
Await further comm
KM/16/8/46



Dear Mr. Joshi,

I am in receipt of your letter No. EDS.329/207-45-4 Ens. dated 2nd August 1946 enclosing estimates of the Chief Electrical Engineer for constructing a single circuit 110 Kv transmission line from Bhadravati to Bangalore for making 50 cycle power of the Jog Falls Power Development available at Bangalore. I note you wish to have my opinion on the type of transmission line structures that may be used to best advantage for constructing this transmission circuit. I am contacting with the Chief Electrical Engineer as you have suggested, and propose to send you my recommendations after considering the further details from the C.E.E.

Yours sincerely,

N. N. Iengar
13/8

K. D. Joshi Esq., M.A., B.E.,
Secretary to Govt. Public Works,
Electrical & Rly. Departments,
General & Revenue Secretariat,
Bangalore.

No. E.D.S. 442/Elect. 207-45-7.
Encls.

ELECTRICAL SECRETARIAT,

Bangalore, 16th August 1946

From

The Secretary to Government,
Electrical Department,
Bangalore.

To *The Chief Electrical Engineer*
to the Government of Mysore,
Bangalore.

Subject:- Construction of a Transmission Line from Bhadravati to Bangalore.

S i r,

D.O.

With reference to your/letter No.4287 dated the 5th August 1946 on the above subject, I am directed to state that Government are of the opinion that the cut lengths, as delivered, be kept by and the fabrication of the balance of structures be held in abeyance, until a decision is taken on the report of Mr. N.N. Iyengar.

I have the honour to be,
S i r,
Your most obedient servant,

Secretary to Government,
Electrical Department.

A.N.16th

No. E.D.S.
Encls.

ELECTRICAL SECRETARIAT.

Dated Bangalore, ...*194*

FROM

The Secretary to the Government of Mysore,
Electrical Department,
Bangalore.

To

The General Superintendent,
Cauvery Power Scheme,
Bangalore.

Elec 207-45-8.

N. N. IENGAR

C/o The Tata Power Co., Ltd.,
Bombay House, Fort,
Bombay, 16th September 1946.

SECRETARY TO GOVERNMENT
Date 20/9
P. W., ELECTL & RYS

BOMBAY 1946
No. 551
Date 23/9/1946

Dear Mr. Joshi,

I refer to my acknowledgment dated 13th August 1946 of your letter No.EDS.329/207-45-4 Elec of the 2nd August 1946. I duly received from Mr.Hayath the drawings of the typical structures proposed for the Bhadravati-Bangalore 110 KV transmission circuit together with relevant information explaining the designs and features of bringing in 50 cycle power to Bangalore direct from Bhadravati and remodelling the distribution system in Bangalore. It has taken me some time to study this question, and I now send you my comments on the proposed constructions.

The 'H' type of structure proposed for the line has been used successfully in Europe and U.S.A. for extra high voltage transmission circuits; the chief merit of this design has however been mostly due to the economies obtained by the use of wood poles and wood cross-arms; I believe it is also your experience in Mysore where, I expect, several 78 Kv circuits and circuits of smaller voltage are continuing to give satisfactory performance. In addition to the cheaper costs of construction where long wood poles are easily available, the insulating properties of the wood has been employed to greatly improve the performance of the line against outages from lightning interferences. I believe, however, this feature has not yet been exploited in Mysore as the wood pole transmission lines have used channel iron cross-arms which make the insulation characteristics of the line the same as those of all-steel supports. I hope it will be possible again to economically exploit the long wood pole resources in Mysore so that all-wood high voltage transmission

Dear Mr. Joshi,

I refer to my acknowledgement dated 13th August 1946 of your [illegible] dated 2nd August 1946. I duly received from [illegible] typical structures proposed for the Bhadravati-[illegible] transmission circuit together with relevant information on [illegible] of wood poles in 80 cycle power to Bangalore direct from Bhadravati and remodelling the distribution system in Bangalore. It has taken me some time to study this question, and I now send you my comments on the proposed constructions.

The 'H' type of structure proposed for the line has been used successfully in Europe and U.S.A. for extra high voltage transmission circuits; the chief merit of this design has however been mostly due to the economies obtained by the use of wood poles and wood cross-arms. I believe it is also your experience in Mysore where, I expect, several 75 Kv circuits and circuits of smaller voltage are continuing to give satisfactory performance. In addition to the shorter spans of construction where long wood poles are easily available, the insulating properties of the wood has been employed to greatly improve the performance of the line against outages from lightning interference. I believe, however, this point is not yet fully explained in Mysore as the wood [illegible] the [illegible] of the [illegible] and [illegible] I hope it will be possible again to accommodate [illegible] In wood pole resources in Mysore [illegible] HT voltage transmission

lines may be built to avail of their excellent performance characteristics.

The 'H' type of structures utilising latticed poles of light steel structurals is apparently intended, as explained by Mr.Hayath, to utilise the steel produced at Bhadravati; as however Bhadravati does not roll any section heavier than 3" x 3" x 5/16", the designs would be governed by this limitation. It would not be economical to design wide based towers with structurals of 3" angles or less. Provided this limitation is not there, that is structurals of adequate strengths for the designs were employed, maximum economical spans can be worked out for each set of conditions to result in total minimum line construction costs. Four legged steel towers on average spans ranging upto 1000 feet have usually proved economical for high voltage transmission circuits.

The earliest 110 Kv transmission line supports in the Tata Hydro Electric system were of a type similar to the steel pole constructions that you are considering. The intermediate supports, designed only for lateral wind, were spaced 500 feet apart and were single narrow based poles, constructed of light steel structurals; they carried two 110 Kv circuits; every 10th tower or approximately one in a mile were wide based four cornered steel towers designed for full dead end and angle duties. These structures were first installed in 1915 and some of them are still in service (though modified some years ago for a single circuit) between Panvel and Khopoli (a distance of 23 miles). In later constructions, the designs of intermediate towers were modified; wide based towers were employed, suitable for both lateral wind and for the torsions with one conductor broken; there were no anchor towers at fixed intervals; they were used where required for angle and dead end duties.

Our latest constructions are also based on designs just mentioned above; but we are installing towers of galvanised steel as in the conditions

of experience we have here, no line that block steel towers have to be painted every 3 to 5 years; this means expense as well as dislocation to service by the erection of important transmission circuits.

We are just now building a 110 Kv transmission circuit from Klopoli to join up to duplicate the line of the very earliest construction that I have referred to before. The largest type of tower we will use is shown in the drawing attached as the "A" tower. The angle and dead end towers are similar in construction, but built out of heavier structurals for the increased duties. The normal span employed is 850 feet; 80 and 30 feet trestles are utilized where extra heights are required for long spans or for crossing over [illegible] or other transmission circuits. We built some 30 miles of single circuit line to these designs in 1937-38; we are now building another 40 miles to the same designs. The designs were developed after very careful study of operating requirements; the constructions have given very satisfactory service; we have a 27 mile line between Shire and Klopoli power stations constructed through some very hilly and undulating ground with special towers [illegible] up long and deep valleys; this line has been operating without a single interruption for many months, and the maintenance on these lines is negligible; actually, the only attention they have needed is removing birds' nests in the nesting season as a precaution against possible interference with the live conductors.

The new circuit we are building will consist of 19/.116" diameter, .8 square inch copper conductors, pulled to have a maximum working tension of 3,780 lbs. As you are adopting the same arrangement of conductors and ground wire, I find that approximately the same tower could be used for your line with 336,400 c.m. A.C.S.R. conductors. The towers could be spaced 800 feet apart normally and provide a minimum normal ground clearance of 35 feet.

For our line, we expect to be able to obtain the towers from Messrs. Bridge Roof and Co., Ltd., Calcutta; they will obtain the steel sections from Messrs. The Tata Iron and Steel Co.Ltd., Jamshedpur, fabricate and galvanise the towers in Calcutta and ship them by boat to Bombay. We are negotiating the business and expect that the fabricated galvanised steel towers will cost us some Rs. 680/- a ton f.o.r. Bombay.

I have prepared a statement of costs of relevant items to compare the economies of stringing the line with latticed steel poles and alternatively with wide based fabricated steel towers. For the steel poles, costs are assumed as mentioned in Mr. Hayath's estimates, except that I have taken for the steel poles the latest revised prices as also intimated by Mr.Hayath. For the steel towers, I have assumed that you could get them for Rs.700/- a ton f.o.r. Madras. It may be noticed, however, that the revised prices for the steel poles are also Rs. 34/- a cwt. Omitting common items such as costs of conductors, conductor stringing, preparation of right of way etc., steel tower costs for two miles are Rs.32,758/- as compared with steel pole costs of Rs.30,985/-. This comparison indicates that if the tower designs are finally adjusted for a normal span of 950 feet or 1000 feet, the tower line construction would cost about the same or slightly less than the steel pole construction. I do not believe it will be advantageous to increase the spans still longer as the relative performance of the line from a service point of view will deteriorate as I will refer to later on, unless insulations and clearances at towers are correspondingly increased at extra costs.

The main features of the line constructions you are considering are satisfactory and within the limitation of utilising local materials, I believe the designs proposed would result in economical constructions. If however the line could be constructed for approximately the same costs with self supporting steel towers, I would prefer the tower designs for an

I have prepared a statement of costs of relevant items to e... the economics of stringing the line with lattticed steel poles and also ... with wide based fabricated steel towers. For the steel poles, costs are assumed as mentioned in Mr. Bayuth's estimates, except that I have taken for the steel poles the latest revised prices as also intimated by Mr.Bayuth. For the steel towers, I have assumed that you could get them for Rs.700/- a ton f.o.r. Madras. It may be noticed, however, that the revised prices for the steel poles are also Rs. 84/- a ont. Omitting common items such as costs of conductors, conductor stringing, preparation of right of way e.g., steel tower costs for two miles are Rs.85,958/- as compared with steel pole costs of Rs.30,955/-. This comparison indicates that if the tower designs are finally adjusted for a normal span of 950 feet or 1000 feet, the tower line construction would cost about the same or slightly less than the steel pole construction. I do not believe it will be advantageous to increase the spans still further as the relative performance of the line from a service point of view will deteriorate as I will refer to later on, unless insulators and clearances are correspondingly increased to suit ...

The main features of the line constructions are considered are satisfactory and within the limitation of utilising local materials, I believe, the designs proposed would result in economical construction. It ... for ... by the ... with ... for a.

important trunk transmission circuit as this to transmit over a single circuit 50 cycle power from Bhadravati to Bangalore, a distance of 165 miles. With 10 MVA condenser capacity at Bangalore, the proposed circuit can deliver about 21 MW in Bangalore; as this circuit, together with the existing transmission circuits to Bangalore may be found adequate for several years to supply the power requirements of the territory, the single circuit should be designed for long periods of uninterrupted service and minimum maintenance attentions. I believe it has been the general experience that if the costs are about the same, self supporting towers are better fitted for such service than designs requiring guyings at frequent intervals.

Rusting of black steel is fortunately not so serious a problem with you as it is in the coastal regions. If however, as present prices indicate, galvanised steel structures could be purchased for about the same costs, it would definitely improve the operating characteristics of the line both as regards service and cost of maintenance.

I wish to refer here to some features of electrical design that may advantageously be included in both the steel pole and tower alternatives. Research and experience with lightning phenomena have indicated that it is desirable to locate the earth wires on the structures so that the conductors are inside a shadow formed when a ray is projected through the ground wires at 30 degrees to the vertical. The suggested locations of the earth wires are shown in the drawings enclosed. It is reported that several transmission lines built with this feature have been completely shielded from direct lightning strokes to the power conductors. It is desirable to employ high strength steel wires for the ground conductors and string them up tightly so that there will be adequate clearances at mid-span, to avoid flashovers between the earth wire and power conductors.

Another measure that might be expected to contribute most to improve

the performance of the line during lightning is to secure low tower footing resistances. In this respect, the four legged towers with large earth grillages are better suited to provide low footing resistances than the steel poles which have to be set in concrete to develop their strength. In the case of steel poles, it would be necessary to employ separate earths at each support to properly ground the steel poles, as otherwise the surge impedance to ground would be very high and there would be more flashovers at the insulators during the lightning season. To secure the same performance on the two lines, cost has to be included of grounding each pole separately; if the earth conditions are favourable, no extra groundings may be necessary for the towers with earth grillages. This will have to be determined by sample measurements along the route of the transmission line.

Other things being the same, increasing the span lengths adversely affects the liability of the line to flashovers during lightning. Assuming that a footing impedance of 20 ohms per tower could be secured, the probable temporary outages of the line due to lightning in a year per 100 miles of the transmission circuit is estimated as follows for a line insulated with 7 disc insulators as proposed:- With 600 feet spans 3.5 outages; with 800 feet spans 4.5 outages; with 1000 feet spans 5 outages; the Bhadravati-Bangalore 165 mile line may therefore have 2½ outages due to lightning more per year if built of 1000 feet spans, rather than with 620 feet spans as proposed for the pole line. It must be mentioned that these estimates of outages are on the basis of experiencing 30 lightning storm days in a year. The probable outages would be proportionately less for lesser incidence of lightning. Lightning is not a serious problem in the Bombay area; there is much more lightning in the Mysore plateaux;

I am not, however, sure if it amounts to as much as 30 lightning storm days in a year. I expect also that the performance of the longer span as compared to the pole line, tower line would not be so unfavourable as its inherent better footing resistances improve the performance of the line.

To ensure continuity of service of this long single circuit line, it is desirable to employ automatic reclosing features on the oil circuit breakers controlling the line at both ends. Mr. Hayath informs methat he proposes to install a synchronous condenser cum frequency changer set at Bangalore to tie the 50 cycle and 25 cycle systems together. When this machine is installed, it will be necessary to have high speed switching on this long line to avoid instability complications. I would suggest that the circuit breakers that may be installed on this line now be such as could be adapted for single phase reclosing as well as three-phase reclosing; three phase automatic reclosing may be employed to begin with, until the necessity arises for single phase reclosing.

I would summarise my comments as below:

The main designs of the steel pole line are satisfactory. Some modifications are suggested to improve its operating characteristics during lightning.

As present prices indicate that for approximately the same costs the line could be built with self supporting wide based towers, it is desirable to consider the tower design for such an important long trunk transmission line as this.

The drawings sent herewith of typical tangent and angle structures indicate generally the features which may be adopted for designing towers for your line.

It may not be necessary in Mysore to use galvanised steel constructions. I would however recommend investigating if the pole tops

or tower tops at least cannot be made of galvanised steel so that transmission line outages would not be necessary for any periodical paintings. We are using such constructions on one of our lines.

I recommend arriving at a decision very early regarding the type of supports to be installed. For the 44 mile transmission circuit we are now building, our requirements are some 800 tons of galvanised steel. We had obtained quotations from tower fabricators of U.K. and U.S.A. English and American deliveries ex their factories are of the order of 6 to 9 months; as Indian quotations are competitive, we hope to be able to obtain our requirements from the sources I have referred to. Probably, the deliveries may be relatively delayed.

Please let me know if you wish to have any further information on this subject.

Sincerely yours,

N. N. Iyengar

17/9/46.

I am sending a copy of the letter + drawings to Mr Hayath also to expedite further studies; I am sorry I have been so late; other work + unexpected developments intervened.

NNI 17/9.

K. D. Joshi Esq., M.A., B.E.,
Secretary to Govt. Public Works,
Electrical & Railway Departments,
General and Revenue Secretariat,
Bangalore.

NNI/VR
Encl: Drawings (4)
Comparative statement.

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as Indian quotations are competitive, we hope to be able to obtain our
requirements from the sources I have referred to. Probably, the deliveries
may be relatively delayed.

Please let me know if you wish to have any further information
on this subject.

Sincerely yours,

K. D. Joshi Esq., M.A., B.E.,
Secretary to Govt. Public Works,
Electrical & Railway Departments,
General and Revenue Secretariat,
...ay...

...ATI
Encl: Ir...ture
Comparative statement.

BHADRAVATI-BANGALORE 110 KV SINGLE CIRCUIT TRANSMISSION LINE;
COSTS OF EQUIVALENT ITEMS FOR 2 MILES WITH SUPPORTS OF LATTICED STEEL POLES AND ALTERNATIVELY OF FOUR LEGGED STEEL TOWERS.

Supports of latticed steel poles		Supports of galvanised steel towers	
15 Tangent supports @ 27 cwts =	405 cwts.	11 Tangent supports @ 58 cwts =	638 cwts.
2 Angle supports @ 43 cwts =	86 cwts.	1 Angle supports @ 78 cwts =	78 cwts.
	491 cwts.		716 cwts.
Steel fabricated & at Rly. sidings		Steel fabricated & at Rly. sidings	
491 cwts @ Rs.34/- =	Rs.16,650	716 cwts @ Rs.35/- =	Rs.25,100
Transport of steel to workspots		Transport of steel to workspots	
@ Rs.20/- a ton =	491	@ Rs.20/- a ton =	716
Concreting 36 footings =	3,600	Excavation =	300
Labour for erection of supports =	1,700	Labour for erection of supports =	3,000
Painting of structures =	425	Not required	-
51 Suspension strings Insulators and hardware		36 Suspension strings Insulators and hardware	
@ Rs.85/- =	4,330	@ Rs.85/- =	3,060
12 Strain strings @ Rs.97/- =	1,164	6 Strain strings @ Rs.97/- =	582
Guy sets erected =	2,625	Not required	-
	Rs.30,985		Rs.32,758

MD 17/9.

Note:- To the cost of the latticed steel pole design, must be added the additional cost of independently protecting the Structures which may be taken as Rs. 25 per Structure, or Rs 425 for two miles of line, bringing up the total for latticed Steel poles to Rs.31,410.

Supports of lattice steel pole	
1 Largest supports @ 27 cwts	= 486 cwts.
2 Angle supports @ 45 cwts	= 90 cwts.
	491 cwts.
Steel fabricated & at Rly. sidings	
6.1 cwts @ Rs.34/-	= Rs.16,850
Transport of steel to contractors	
0 Rs.8/- a ton	= 491
Concreting 36 footings	= 3,600
Labour for erection of supports	= 1,700
Painting of structures	= 485
31 Suspension strings Insulators and hardware	
@ Rs.85/-	= 4,330
12 Strain strings @ Rs.97/-	= 1,164
Cu. cwts erected	= 2,625
	Rs.30,985

Erection of lattice steel tower	
11 Largest supports @ 52 cwts	= 638 cwts.
1 Angle supports @ 73 cwts	= 73 cwts.
	715 cwts.
Steel fabricated & at Rly. sidings	
715 cwts @ Rs.35/-	= Rs.25,100
Transport of steel to workspots	
0 Rs.20/- a ton	= 715
Excavation	= 300
Labour for erection of supports	= 3,000
Not required	-
36 Suspension strings Insulators and hardware	
@ Rs.85/-	= 3,060
6 Strain strings @ Rs.97/-	= 582
Not required	-
	Rs.32,758

TELEPHONE No. 2110.

IN REPLY REFER TO No. 10936 ENCLO.

TELEGRAPHIC ADDRESS:
"GOMED"

CODES USED
BENTLEY'S LIEBER'S
A. B. C. 6TH EDITION
BUSINESS TELEGRAPH CODE.

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE CHIEF ELECTRICAL ENGINEER

Camp Mysore, *Bangalore*, 10th October 19 46.
(MYSORE, S. INDIA.)

The Secretary to the Govt. of Mysore,
Electrical Department,
BANGALORE.

Sir,

Subject:- Bangalore-Bhadravati Transmission Line.

I have the honour to invite your kind reference to Mr. N.N. Iengar's letter dated 16th September 1946, furnishing his views on the proposed construction of the above transmission line, and to specially invite your kind reference to para 3 page 4 wherein the following note appears:-

> "The main features of the line construction you are considering are satisfactory and within the limitation of utilising local materials. I believe the design proposed would result in economical construction."

In conclusion, Mr. Iengar expresses the view that the design proposed by me is economical considering the use of local materials. However, he suggests that tower design be adopted at a small extra cost.

The adoption of tower design involves purchase of steel from outside and obtaining the same from manufacturers in Calcutta. The department's experience in obtaining material from outside has been a bitter one. Considerable delays occur and transport from Calcutta to Bangalore has involved in the past, even in the case of most essential materials with the assistance of the Electrical Commissioner with the Government of India, delays of 12 to 18 months. In my humble opinion our design should be such as to utilise the local materials so long as they are not excessively costly and the designs meet the requirements of the work.

P.T.O.

In as much as Mr. Iengar has expressed the view that the design now suggested by the department is the most economical design, using the local materials, and as the order for the steel structures is being placed with the Mysore Iron and Steel Works, which is another department of Government, I feel it is in the interests of Government to adopt this design, as the money to be spent for the structures is to be utilised within the State. I therefore request orders of Government whether the fabrication of the structures, which has been stopped as per G.O.No. EDS-442-S dated. 16-8-46., may be continued and the Mysore Iron and Steel Works directed to proceed with the work.

Further, it is seen that apart from the difficulty of obtaining materials from outside and transport difficulties to be experienced between Calcutta and Bangalore, the cost of tower design, as worked out by Mr. Iengar, is ₨1,773/- per two miles in excess of the H-frame design proposed by the department.

With regard to the performance of the line to be constructed with H-frame design, I have to state that the department has used this design for practically all the High Tension transmission lines that are in service and these are working at present quite satisfactorily.

Very early orders of Government may kindly be obtained and communicated.

I have the honour to be,
Sir,
Your most obedient servant,

Chief Electrical Engineer.

MH-CSC.

Elect 207-45-10.

TELEPHONE No. 2110

No. 13089

ENCLO. One

TELEGRAPHIC ADDRESS:
'GOMED'

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE CHIEF ELECTRICAL ENGINEER.

Bangalore, 6th November 1946.

(MYSORE, S. INDIA)

The Secretary to the Govt. of Mysore,
Electrical Department,
BANGALORE.

7.11.46

No. 835

7.11.46

Sir,

Subject:-Structures for Bangalore-Bhadravati and Jog-Bhadravati Transmission Lines.

--

In continuation of this office letter No.10456 dated the 10th October 1946, I have the honour to enclose herewith a copy of the letter I have received from the Sales Manager, Mysore Iron & Steel Works, and to request that early orders of Government may kindly be obtained and communicated in this behalf.

I have the honour to be,
Sir,
Your most obedient servant,

Chief Electrical Engineer.

MH-CSC.

Copy of letter No.8399 dated 2nd November 1946 from the Sales Manager, Mysore Iron & Steel Works, Bhadravati, to the Chief Electrical Engineer to the Govt. of Mysore, Bangalore.

Re:- Structures for Bangalore.Bhadravati & Jog-Bhadravati Transmission Lines.

--

We invite kind reference to correspondence resting with your letter No.5794 of 20th August 1946 and shall thank you to kindly advise if Government have since ordered resumption of fabrication of transmission towers and if we may take up fabrication of structures for the above lines.

As we have already purchased on your account considerable quantities of raw materials for this work and our funds are locked since a long time, we shall be grateful for a very early decision.

COPY

CSC.

Chief Electrical Engineer 6/11

R.Ramakrishna, M.Sc., E.E., M.A.I.E.E.,
Secretary to Government,
Electrical Department.

Immediate

D.O.No. E D S 1198

7th November 1946

Dear Mr.Narasimhan,

As the question of adopting four-legged steel towers for High Tension Transmission lines is being examined by Government, I would request you to kindly let me know the various sizes of mild steel angles that the Mysore Iron and Steel Works can roll, and the maximum lengths in which such angle iron can be supplied.

The favour of a reply by return of post is requested.

Yours sincerely,

R.R. 7.11.46

M.K.Narasimhan, Esq., B.A.,
Ag. General Manager,
Mysore Iron & Steel Works,
Bhadravati.

ISRN.

THE MYSORE IRON AND STEEL WORKS
BHADRAVATI

L/C

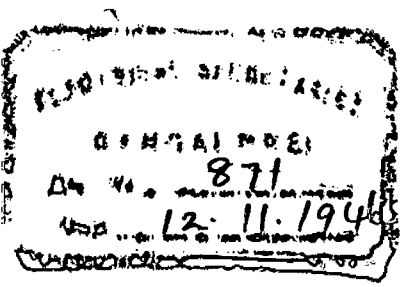
M.K.NARASIMHAN,
Ag.General Manager

89½

Bhadravati,
9th November, 1946

Dear Mr. Ramakrishna,

With reference to your D.O. Letter No. E.D.S 1198 of the 7th instant, I furnish below the sizes of M.S.Angles and the maximum length in which they could be supplied for your information.



Size of Angles.		Maximum Length.
1.1/2" x 1.1/2" x 1/4"	..	50'
2" x 2" x 1/4"	..	50'
2.1/2" x 2.1/2" x 1/4"	..	50'
3" x 3" x 5/16"	..	40'
3.1/2" x 3.1/2" x 5/16"	..	35' - 40'
4" x 4" x 5/16"	..	-do-

Yours sincerely,
M K Narasimhan
10.11.46

R.Ramakrishna, Esqr., M.Sc.,
E.E., M.A.I.E.E.,
Secretary to Government,
Electrical Department,
Electrical Secretariat,
Public Offices,
BANGALORE.

R.R.
12/11/46.

This may be filed along with the Correspondence on the question of Towers for the Bhadravati - Bangalore 110 KV. Trans. Line
C.L.

NDS/9-11-46 9.11.46

The Works will not be in any way liable for non-performance either in whole or in part of any contract for any delay in performance thereof in consequence of strikes, shortage of labour, breakdown or accident to machinery or other accidents of whatever nature, failure on the part of the Railway Company to supply sufficient wagons to carry essential raw materials to and finished products from the Works and all causes of whatever nature beyond the Work's control.

THE MYSORE IRON & STEEL WORKS

(GOVERNMENT OF MYSORE)

TELEGRAPHIC ADDRESS:
"MYSIRON" BHADRAVATI

CODES:
ENTLEY'S
WESTERN UNION FIVE LETTER
A. B. C. 6TH EDITION.

MANUFACTURERS OF:

CHARCOAL PIG IRON IN 7 GRADES

CAST IRON PIPES 2" TO 33" DR.

ROLLED MILD STEEL BARS AND RODS, LIGHT STRUCTURES, ANGLES

GENERAL CASTINGS

METHANOL C.P DENATURING

METHYL ACETONE

ACETATE OF LIME

HARD WOOD TAR AND PITCH

WOOD PRESERVATIVE

BLACK PAINT

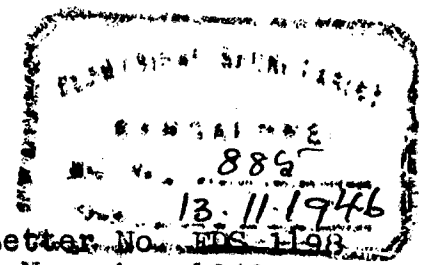
KRESO (DISINFECTANT)

"CHAMUNDI" BRAND PORTLAND CEMENT

BHADRAVATI
(MYSORE STATE RAILWAY)
INDIA

Ref. S/SS/ 0912

12th November 1946.



The Secretary to Government,
Electrical Department,
Public Offices, BANGALORE.

Dear Sir,

Ref:- Your D.O.Letter No. ~~EDS 1193~~
of the 7th November 1946.

With reference to your telephone message of the 11th instant, I have already sent a reply in my D.O. Letter No. 8916 of the 9th instant, a copy of which is enclosed for ready reference.

Yours faithfully,

Ag. General Manager (i/c)

Encl:-1

NDS/12-11-46

The main file has been submitted to Minister for P.W.

THE MYSORE IRON & STEEL WORKS
BHADRAVATI
M.K.Narasimhan
Ag. General Manager.

Bhadravati,
9th November, 1946.

Dear Mr. Ramakrishna,

With reference to your D.O.Letter No. E.D.S. 1198 of the 7th instant, I furnish below the sizes of M.S.Angles and the maximum length inwhich they could be supplied for your information.

Size of Angles.		Maximum length.
1.1/2" x 1.1/2" x 1/4"	...	50'
2" x 2" x 1/4"	...	50'
2.1/2" x 2.1/2" x 1/4"	...	50'
3"x3" x 5/16"	...	40'
3.1/2" x 3.1/2" x 5/16"	...	35' - 40'
4" x 4" x 5/16"	...	-do-

Yours sincerely,

Sd/- M.K.Narasimhan.

R.Ramakrishna, Esqr., M.Sc.,
E.E., M.A.I.E.E.,
Secretary to Government,
Electrical Department,
Electrical Secretariat,
Public Offices, Bangalore.

"COPY"

NDS/12-11-46

Dc Venkata Rao
General Manager in Charge.

12/11/46.

D.O. No.EDS 1312

15th ~~15~~th Novr. 6

Dear Mr Iengar,

I wish to acknowledge with many thanks receipt of your letter dated 16th September 1946, addressed to Mr.Joshi, which unfortunately has remained unacknowledged till now.

In the light of your proposals and valuable suggestions, the question of using towers for the Bhadravati-Bangalore 110 KV transmission line is receiving our serious consideration and a decision thereon is expected to be taken shortly. I agree with you that the cost of tower line being about the same as that of a latticed pole structure line, the adoption of towers would be desirable. We are examining the possibility of rolling 4"x4"x5/16" angles at our Bhadravati Iron Works in which case the problem of supply of the necessary raw steel would be simplified.

Thanking you again and with kindest regards.

Yours sincerely

RL.

N. N. Iengar, Esq.,
c/o The Tata Power Co., Ltd.,
Bombay House, Fort,
B o m b a y.

TSRN.

B.A. B.S.E.E.

D.O.

Appendix F. G.—1]

SUBJECT Fabrication of steel structures for Bhupalam Bhadravati and Jog–Bhadravati Transmission Lines

Section Steel
File-No. 20/45
Serial No. 12

Diary No. of letter replied to.....

DO No. EDS 1329 Dt. 18-11-1946

General and Revenue Secretariat

( )

the 194

To.

The Ag. General Manager,
Mysore Iron & Steel Works
Bhadravathi

Date of issue 18th November 1946

Signed by H.R. Rama Krishna

Dear Mr Narasimhan,

With reference to your D.O. letter No 8916 dated the 9th November 1946 on the above subject, I write to request you kindly to forward your report re. the feasibility of rolling 4"×4"×$\frac{1}{2}$" and 3½"×3½"×$\frac{5}{16}$" angles besides the usual intermediate angles that are now being rolled at the

List of enclosures.....

Copied by.....

Examined by.....

Bhadravathi Iron & Steel Works.

An immediate reply is requested as Govt. have to come to an early decision on the question of Transmission Line Towers.

Yours sincerely

R.L.
18/11/46

16/11 Gen 16/11 - T 18/11

D.O.No. BDS 1474/
Elect 207-45-13

30th Nov. 1946

Subject:- Fabrication of Steel Structures.

Dear Mr. Narasimhan,

I write to confirm the following telegram sent to you to-day.

MYSIRON, BHADRAVATI.

REFER EDS 1329 EIGHTEENTH INSTANT AND REMINDER EDS 1384 TWENTYSIXTH INSTANT REGARDING ANGLES FOR TRANSMISSION STRUCTURES STOP PLEASE EXPEDITE REPORT ALREADY OVERDUE

ELECTRICAL SECRETARY

Yours sincerely,

RR. 30.XI.

M. K. Narasimhan, Esq., B.A.,
Acting General Manager,
Mysore Iron and Steel Works,
Bhadravati.

EXPRESS TELEGRAM

MYS IRON

BHADRAVATI

REFER EDS 1329 EIGHTEENTH INSTANT AND REMINDER EDS 1384 TWENTYSIXTH INSTANT REGARDING ANGLES FOR TRANSMISSION STRUCTURES STOP PLEASE EXPEDITE REPORT ALREADY OVERDUE

ELECTRICAL SECRETARY

NOT TO BE TELEGRAPHED

R.R. 30-XI.

ELECTRICAL SECRETARY

OLD PUBLIC OFFICES: BANGALORE.

d/c

EXPRESS TELEGRAM

MYS IRON

BHADRAVATI

REFER EDS 1329 EIGHTEENTH INSTANT AND REMINDER EDS 1384 TWENTYSIXTH INSTANT REGARDING ANGLES FOR TRANSMISSION STRUCTURES STOP PLEASE EXPEDITE REPORT ALREADY OVERDUE

ELECTRICAL SECRETARY

NOT TO BE TELEGRAPHED

R. Ramakrishna

ELECTRICAL SECRETARY

OLD PUBLIC OFFICES, BANGALORE.

Elect 207-45-14 El.Br. Immediate!

D.V.KRISHNA RAO,
Ag.General Manager, i/c.

THE MYSORE IRON & STEEL WORKS

BHADRAVATI

RK 2/12

30th November 1946. 2/12

Regd. No. 1027
2.12.1946

Dear Mr. Ramakrishna,

Subject: Fabrication of steel structures for Bangalore-Bhadravati and Jog-Bhadravati Transmission Lines.

+++

In the absence of Mr. M.K. Narasimhan, Ag. General Manager, I am replying to your D.O.letter No.EDS 1329/Elel.207-45-12 dated the 18th instant.

Angles of the sizes referred to in your letter, viz., 4" x 4" x 5/16" and 3½" x 3½" x 5/16" are being rolled in our Mills. But when rolling these angles, the production of a large number of other sections like rounds, squares and flats will be curtailed. On a careful consideration of the question, we would be in a position to supply about 100 tons angles, per month, in any two sizes between 2" and 4". The production of 1½" angles will invariably be low, and I would therefore suggest elimination of this section as far as possible in the new designs of structures that may be considered.

If any further information is required, I shall be glad to furnish the same on hearing from you.

Yours sincerely,

D.V. Krishna Rao

R. Ramakrishna, Esq, M.Sc.E.E.,(Wis),
M.A.I.E.E.,
Secretary to Government,
Electrical & Railway Departments,
Public Offices, Bangalore.

O.T.D.

s

I have just now received your telegram (5 p.m) reading as under:

"REFER EDS 1329 EIGHTEENTH INSTANT AND REMINDER EDS 1374 TWENTYSIXTH INSTANT REGARDING ANGLES FOR TRANSMISSION STRUCTURES STOP PLEASE EXPEDITE REPORT ALREADY OVERDUE - ELECTRICAL SECRETARY ".

I regret the delay.

Ag. General Manager i/c.

E.D.S. 1814

Elecl 207-45-15.

Janry. 47

~~Electrical Department, Bangalore.~~

To

The Chief Electrical Engineer
to the Government of Mysore,
Bangalore.

Sir,

Construction of a Transmission Line from Bhadravathi to Bangalore.

With reference to correspondence ending with E.D.S. No.1211/ Elecl.207-45-11 dated 7th November 1946, I am directed to convey approval of Government to the fabrication of the remaining H-frame structures required for the above Transmission line being continued and completed.

In this connection, I am to state that as a comparison of the cost of H-frame structures with that of rigid four-legged towers goes to show that these costs are about the same, the adoption of the rigid tower design for a long and important High Tension Transmission line like the one under consideration, would have been preferable to the semi-flexible H-frame structures. However, Govemment have approved of the H-frame design for this line only because of the urgency of the work and in view of the raw steel having already been received and cut to required lengths as stated in your D.O.No. 4287 dated 5th August 1946. I am to further add that the use of rigid four-legged towers of necessary strength and sizes should be given a very careful consideration while designing future Transmission lines of 66 K.V. and above.

Your estimate amounting to Rs. 98,65,000/- received with your letter No. 33344 dated 25th March 1946 is receiving the attention of Government and orders thereon will be communicated in due -

P.TO.

course.

I have the honour to be,

Sir,

Your most obedient servant,

R.R. 7.1.47

Secretary to Government,
Electrical Department.

TDC.

No.E.D.S. 1824
Elec. 207-45=16

8th Jany. 47

Electrical Department, Bangalore.

The Chief Electrical Engineer
to the Government of Mysore, Bangalore.

Sir,

110 K.V. Transmission line from Bhadravati to Bangalore.

Adverting to correspondence ending with this office letter No.EDS.1814/Elecl.207-45-15 dated the 7th instant, I am directed to observe that in the estimate amounting to Rs.98,65,000/- received with your letter No.33344 dated 25th March 1946, a provision of Rs.42,600/- has been made under estimate "D" for an out-door terminal structure at the Bhadravati switchyard. Similarly a sum of Rs.85,000/- has been provided under estimate "E" for Terminal and Transformer structure complete with busses, etc. at Bangalore. As these provisions are not susceptible of check without drawings concerning their design and the layout of the switch-yards, these may kindly be arranged to be sent.

As it is proposed to interconnect the new station at Bangalore with the existing A, B & C. Stations, a one-line diagram showing the proposed electrical connections may also be sent.

It is noticed that the Transformers to be installed at Bangalore are stated to be of 110 K.V./4.4 K.V. rating. It is presumed that the figure of 4.4 K.V. is a typographical error for 4.6 K.V. I am desired to enquire in this connection, in what stage the question of purchase of these Transformers now stands.

I have the honour to be,
Sir,
Your most obedient servant,

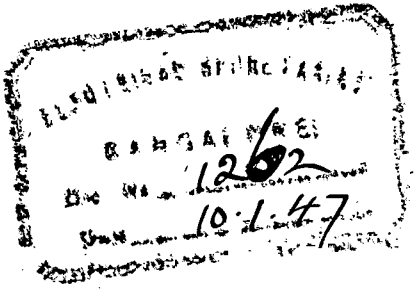
RGL 8/47
Secretary to Government,
Electrical Department.

TDC.

Elect 207-45-18

M.N. NARASIMHAN,
Ag General Manager,
THE MYSORE IRON & STEEL WORKS
BHADRAVATI

13091



7th January 1947.

Dear Mr. Ramakrishna,

Structures for Bangalore-Bhadravati and Jog-Bhadravati Transmission Lines.

With reference to our conversation on the 28th ultimo, I request you to be so good as to let me have a design of the new type of fabricated towers and your requirements.

Yours sincerely,
M.N. Narasimhan
7.1.47

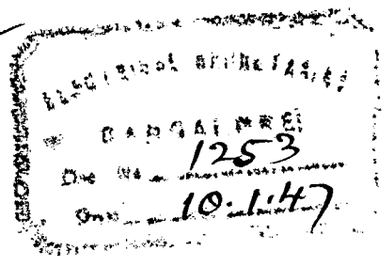
R.Ramakrishna, Esq., M.Sc. E.E. (Wis)
M.A.I.E.E.,
Secretary to Government,
Electrical and Railway Departments,
Public Offices,
Bangalore.

Pl. put up the file relating to this.
RR.
10.1.47

krn/-

Elec 207-45-17

TELEPHONE No. 2110
No. 19769
ENCLO. Two Drawings.
TELEGRAPHIC ADDRESS:
'GOMED'



GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE CHIEF ELECTRICAL ENGINEER,
Bangalore,... 9th January.....1947.
(MYSORE, S. INDIA.)

The Secretary to the Govt. of Mysore,
Electrical Department,
BANGALORE.

Sir,

110 K.V. Transmission line from Bhadravati to Bangalore.

With reference to your letter No.EDS-1824/Elecl.207-45-16 dated the 8th instant, on the above subject, I have the honour to enclose herewith a copy of our Drg.No.PWP-2 showing the lay out of the equipment at the new Station at Bangalore. This is a preliminary drawing to be finalised when the actual dimensions of the transformer and other switchgear are received from the manufacturers.

With regard to the Out-door structure at Bhadravati, the present structure is to be extended by one bay for housing the oil circuit breaker of the Bangalore-Bhadravati Transmission Line and the estimated cost of the same has been furnished under Estimate D, and the bay will be identical to the present bays, except that the width will be altered, if required to suit the final dimensions of the circuit breaker to be obtained on this order.

With regard to the inter-connection of the New Station at Bangalore with the existing A, B & C Stations, a single line diagram, Drg. PWP-9, is enclosed for favour of information of Government.

The transformers to be installed at Bangalore are of 110 kV/4.4 kV rating. These transformers along with the switchgear and transformers for Jog and generators and turbines for Jog have already been ordered.

I have the honour to be,
Sir,
Your most obedient servant,

Chief Electrical Engineer.

MH-CSC.

D.S.No. 1951

Ecd 207-45-49-8

20th Jany. 47

Electrical Department, Bangalore.

The General Manager,
Mysore Iron & Steel Works, Bhadravati.

Sir,

Rigid towers for High-tension Transmission Lines.

Adverting to your D.O. letter No.13091 dated the 7th instant, I am directed to send you herewith one copy of each of the following drawings showing the design of fabricated rigid four-legged steel towers for High-tension Transmission lines, which is being contemplated for adoption in future.

1) Phoenix Engineering Corporation Drawing No.E-51182, "A" Tower.
2) - do - Drg. No.E-51183 - "B" Tower.
3) - do - Drg. No.E-51186 - "B" Tower Extension.
4) - do - Drg. No.E-51178 - Grillage Footings.

In view of the fact that about 615 H-frames and 74 Angle structures are reported to have already been fabricated for the Bhadravati-Bangalore 110-K.V. Transmission line, it has been decided not to make any changes at this stage in the design of the structures for this particular line. However, the Chief Electrical Engineer has been requested to give due consideration for the adoption of four-legged tower designs for all future Transmission lines of 66 K.V. and above. As the Electrical Department has an extensive programme of constructing new High-tension lines in the next few years, it is desirable that the question of fabricating the towers required therefor be now thoroughly investigated with regard to both cost as well as terms of delivery. Therefore, the favour of your detailed report at an early date is requested.

The drawings herewith sent may kindly be arranged to be returned with your report.

I have the honour to be,
Sir,
Your most obedient servant,

R.R. 20/1/47
Secretary to Government,
Electrical Department.

TDC.

E.P.S. No. 1988

Elect 207-45-20.

23rd Jany. '47

Electrical Department, Bangalore.

The Chief Electrical Engineer
to the Government of Mysore, Bangalore.

Sir,

Estimate for constructing a 110-K.V., Single Circuit Transmission line from Bhadravati to Bangalore, etc.

With reference to correspondence ending with your letter No. 19769 dated the 9th instant, I am directed to request you to kindly arrange to send copies of the following Drawings:-

Drawing Nos:- T.275, 221-B, T.279, SNP.33, G.473, G.449 and G. 445.

2) It is noticed under Estimate "L" that a provision of three Oil Circuit Breakers, 110 K.V., has been made at a cost of Rs2,23,200/-. A reference to Drawing No.PWP.9 reveals that two of these Breakers are to function as Bank High-tension Breakers, while the third one is on the in-coming side of the 110 K.V. Bus. In as much as the proposed 50 cycle Transmission line coming into Bangalore is of single circuit only, and as a fault on the High-tension bus in a well-designed modern station is a very rare occurrence, the purpose this third Breaker is expected to serve is not understood. It would seem that this Breaker is redundant, as for all practical purposes of isolating the High-tension bus from the in-coming line, a set of group-operated, 110 K.V. Isolators in that position would suffice. A saving of about Rs.75,000/- could thus be achieved by deleting this Breaker. 81,000. GR.

3) With regard to provisions made under Estimate "M" for inter-connecting the New Station with A,B,& C. Stations, large sums of money are provided for "Miscellaneous materials, cable laying, galvanized and stone-ware pipes, etc." It may please be explained as to whether the cables are proposed to be laid in stone-ware pipes

or directly under-ground in trenches.

4) The rating of the Transformers is seen to be 110 K.V./ 4.4 K.V. As the present Transformers in the Distribution - System are of a nominal rating of 2.3 K.V.-4.6 K.V./115-230 Volts, it is not understood why a voltage of only 4.4 K.V. was specified for the main Transformers. The difference of 200 Volts is a substantial cut equivalent to nearly 4.5% of the Distribution Primary Voltage, which can hardly be sacrificed if satisfactory voltages are to be obtained at the consumers' premises without unnecessarily resorting to the lower voltage taps in the primary windings of the Distribution Transformers and increasing the distribution losses. The normal potential gradient of a well designed Distribution System would dictate a voltage at the Bus-bars about 5% higher than the nominal voltage with a normal rated voltage in the middle of the System, and a voltage not lower than 5% of the rated voltage at the far end of the line, so that the voltage regulation of the System may be kept within the prescribed limits. As the Transformers are reported to have already been ordered, you are requested to examine the possibility of cabling to the Suppliers to raise the Low-tension voltage to 4600 Volts (or even 4800 volts) if their manufacture is yet under way, as such a change would be highly desirable and necessary in the interest of satisfactory service in a growing metropolis like Bangalore.

The favour of an early reply is requested.

I have the honour to be,
Sir,
Your most obedient servant,

RL. 23.1.47
Secretary to Government,
Electrical Department.

TDC.

Elecl 207-45-21.

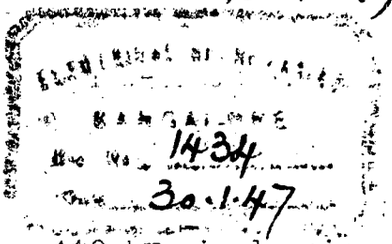
TELEPHONE No. 2110
No. 21883
ENCLO.- 7 Drgs
TELEGRAPHIC ADDRESS:
'GOMED'

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE CHIEF ELECTRICAL ENGINEER,
Bangalore, 28th January ....1947.
(MYSORE, S. INDIA.)

29-1-47

The Secretary
to the Govt. of Mysore,
Electrical Department,
Bangalore.



Sir,

Estimate for constructing a 110-kV. single circuit transmission line from Bhadravati to Bangalore &c.

With reference to your letter No.EDS.1988/Elecl.207-45-20 dated the 23rd January 1947 on the above subject, I have the honor to state as follows:-

1) The following drawings are enclosed for the information of Government:-

Drg.Nos. T-275, 221-B, T-279, SNP-33, G-473, G-449 & G-445.

2) Estimate 'E' provides for three Oil Circuit Breakers of 110-kV. at a cost of ₹2,23,200/-. Two of these Breakers are to function as Bank High-tension Breakers and the third one is for the 110-kV. line. Even though a single-circuit transmission line is to be constructed between Bhadravati & Bangalore, in my opinion a well-designed station having two transformers should have three high-tension Breakers - one for the incoming line and two to serve on the high-tension side of the transformers - particularly in the case of Bangalore-Bhadravati Transmission Line, as this is a link to inter-connect the 25 & 50 cycle systems. Unless a Breaker is provided at the end of 165 miles of transmission line at Bangalore, I believe it will not be possible to provide a satisfactory relay system for maintaining continuity of service on a line which is meant to serve as a link between two different systems. The third Breaker provided by me in Estimate 'E' is not only not redundant, but essential, even though it involves a cost of ₹75,000/-. Hence, it has been provided for in the estimate and the equipment also has been ordered for along with the other equipment meant for this work.

Why not?

3) With regard to the provisions made under Estimate 'M' for 'Miscellaneous materials for laying the cables', it has to be stated

that the nature of protection to be provided for the cables will depend upon the nature of the soil and the nature of obstructions through which the cable has to be laid. Galvanised iron or cast iron pipes may have to be used for road crossing, railway crossing and large sanitary drain crossing; stone-ware pipes will have to be used wherever the cable is likely to be damaged by inhabitants of a locality; and in the open country where there are no obstructions, it is proposed to lay the cable directly in a trench with sand covering. As it is difficult to gauge exactly to what lengths of the cable these types of protection have to be afforded, a lumpsum provision has been made in the estimate.

4) With regard to the rating of the step-down transformers at Bangalore to be installed at the new Station, I wish to state that the main factor that dictated the adoption of 4.4-kV. both for 25 and 50 cycles for the Bangalore Step-down Station is the voltage rating of the 12500-kVA. Frequency Changer Set that is proposed to be transferred from Bhadravati to Bangalore for inter-connecting the 25 & 50 cycle systems at Bangalore, the rating being 4.4-kV. on both the 25 & 50 cycle sides.

It is made out that the standard practice for a low tension bus voltage of a station is to be about 5% higher than the distribution voltage required and therefore for a 4.4 kilo-volt distribution, 4.6 kilo-volt should be the bus voltage. But it is seen that in the case of distribution voltages of 11-kV. & 13.2-kV. no such practice is in vogue in the Department and I am not aware of such a procedure being adopted elsewhere in the case of their distribution systems of 6.6 and 11-kV. Further, a bus voltage of 4.4 kilo-volt has been adopted in the Department as early as 1938 in the case of Belagola. Such being the case, there is no reason whatsoever why we should adopt it in the case of Bangalore where it is proposed to have a 4.4-kV.distribution system to be in line with the standards. I may here further add that Bangalore Distribution system contains a large number of 2.3-kV.distribution transformers which have to be replaced by higher voltage transformers when 4.4-kV. distribution is adopted, when it is proposed to instal 4.4-kV. distribution transformers. Thus it will be seen that it is unnecessary to alter the secondary voltage of the step-down transformers on order for Bangalore. It may here be mentioned also that the 4.6-kV.transformers

that are in service in Bangalore have voltage tappings of 4400 and 4160 volts. It is thus clear from the above that appropriate voltage has been specified for the step-down transformers of Bangalore.

This is not at all clear to me. I do not agree with the C.E.E.'s statements.
RR.
30/1/40.

RR/30/1

I have the honor to be,

S i r,

Your most obedient servant,

Chief Electrical Engineer. 29/1

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE.

General and Revenue Secretariat,

Dated Bangalore, 3rd Feb. ....194 7.

E.P.S. No. 2112
Ekel 207-45-22

FROM,

The Secretary to the Government of His Highness the Maharaja of Mysore.
Electrical Department, Bangalore.

To

The Chief Electrical Engineer,
B a n g a l o r e.

Subject:- Estimate for constructing a 110 KV. single Circuit Transmission Line from Bhadravati to Bangalore, Etc.

S i r,

With reference to your letter No.21883 dated 29th January 1947, I am directed to request you to kindly state in detail your reasons for holding the view that the third breaker in the line position is essential. The nature of the relay protective system proposed at the new station, and in what way the relay protective scheme would be impaired by an omission of this breaker may also be kindly explained. As the installed cost of this breaker is estimated to be about Rs 81,000/-, such a large expenditure requires full justification.

2. With regard to the last paragraph of your letter, I am directed to state that even if the voltage rating of the frequency changer set that is proposed to be transferred from Bhadravati to Bangalore is 4.4 K.V., that should not have been an impediment to the adoption of 4600 volts for the secondary voltage of the main transformers to be installed at the new station in Bangalore as motors are designed to operate satisfactorily within limits of plus or minus 10% of the rated voltage. Further, it is a fact that even in systems of 11 K.V. and 13.2 K.V. the sending end voltages are higher to compensate somewhat for the drop in voltage in the out-going feeders. Thus voltages of 11,500 and 13,800 have been very much in vogue. The figures of 11 K.V. and 13.2 K.V. represent "nominal system voltages" and do not signify as being the

the voltages at any particular point in a system, but are merely values assigned for the purpose of designation to a system of given voltage class.

3. With regard to your statement that a bus voltage of 4.4 K.V. was adopted in the department as early as 1938 in the case of Belagola, it has to be mentioned that the case now under consideration is not analogous to that of Belagola, where the power stepped down is utilised at the spot and not retransmitted over several miles as will be the case in Bangalore. It is seen from your estimates that the 50-cycle power to be stepped down at the new station is to traverse a distance of 2, 4.6. and 4.2 miles to A, B, and C. Stations respectively before this power can be further transmitted over the various primary distribution feeders in and outside the City. Therefore, to start out with a drop of 4.5% in voltage is going to be a definite handicap from the standpoint of both voltage regulation and power loss. The importance of both these factors will be appreciated on account of the fact that conditions of good service require that variations in voltage for residential lighting should not be more than 2 to 3%, and a drop of 1% in voltage means a drop of 1½% in power consumption. Further, as line losses vary inversely as the square of the voltage, losses in the primaries of the distribution system are bound to go up on account of the lower voltage. While the taps in the high voltage windings of distribution transformers may no doubt by proper manipulation give more or less a satisfactory Secondary voltage, they cannot obviate the loss of 200 volts it is proposed to start out with. The resulting economic loss to Government due to both these causes is obvious.

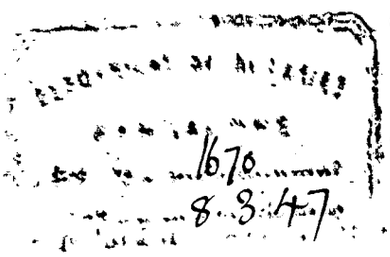
4. On account of these reasons and the fact that the trend should be towards higher voltages and not towards lower voltages, you are once again requested to ascertain from the manufacturers the possibility of the secondary voltage of the main transformers being raised to 4600.

I have the honour to be,
S i r,
Your most obedient servant,

R.R. 3/2/47.
Secretary to Government,
Electrical Department.

Ebel 207-45-23

TELEPHONE No. 2110
NO. 25722.
ENCLO.
TELEGRAPHIC ADDRESS:
'GOMED'



GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE CHIEF ELECTRICAL ENGINEER,
Bangalore, 7th March 1947.
(MYSORE, S. INDIA.)

The Secretary to the Govt. of Mysore,
Electrical Department,
BANGALORE.

Sir,

Subject:- Estimate for constructing a 110 kV single circuit transmission line from Bhadravati to Bangalore, etc.

With reference to your letter No.EDS-2112/Elcl.207-45-22 dated the 3rd February 1947, on the above subject, I have the honour to state as follows:-

As already intimated in my letter No.21883 dated 29th January 1947, three oil circuit breakers have been provided in the Estimate E. Two of these breakers are to function as bank High Tension breakers and the third one is for the 110 kV line. The relay protective system proposed to be adopted is as follows -

The transmission line is to be equipped with impedance and earth leakage relays. The transformers are to be protected with magnetic balance relay and overload relays. It is felt that the two protective systems referred to above cannot be adopted easily without providing a separate breaker at the end of the transmission line. Further, the Bangalore-Bhadravati Transmission Line is a tie line between two large systems with possibility of flow of power in either direction and when comprehensive relay system is to be adopted for installation on the net work of the transmission lines tieing the two systems together, a separate breaker for the transmission line will provide the necessary facility for the relay system of the transmission system being entirely independent of the relay system of the transformers at respective places. Hence three breakers have been provided in the estimate referred to above.

With regard to the second para of your letter, I have to state that the general practice is to decide upon a standard voltage for distribution and the secondary voltage of the step-down transformers to be installed is fixed depending upon the distribution voltage proposed to be adopted. The transformers are generally in a large system provfded with On Load tap changing device to compensate for the drop in voltage in the transmission and transformation. Wherever the step-down transformers are equipped with On Load tap changing gear with sufficient number of tappings to enable appropriate voltage being maintained on the secondary side to suit the distribution

P.T.O.

But it is the voltage at the end of the secondary that matters. RR.

system, there is no need to fix the voltage of the low tension side higher than the standard voltages adopted. In this particular instance the transformers are equipped with On Load tap changing gear with tappings 15 per cent below the rated voltage, which will enable us to maintain about 7 to 8 per cent higher voltage than 4.4 on the secondary side.

H.T

Transformers cannot operate continuously at more than 5% over-voltage RL 7.3.47

There can be no two opinions on the point that the losses in the distribution system will be less, if higher voltages are adopted for the distribution system for a given load. I would have been happier if it was possible to adopt 6.6 or 11 kV for the distribution system of Bangalore, but as the conditions exist, these voltages obviously could not be adopted. The main factor that determines a well designed distribution system is that the variation of voltage at the consumers' premises should be within permissible limits and it is an accepted fact that any distribution system can be designed to the above standard, no matter what the voltage of the distribution system adopted is.

However, M/s. The International General Electric Co. were cabled to intimate if they were in a position to provide 4.6 kV on the secondary side instead of 4.4 kV originally specified at this stage. They have cabled that this could be done without extra cost and accordingly they have been directed to provide for the 15,000 kVA transformers to be installed at Bangalore a secondary voltage of 4.6 kV.

I have the honour to be,
Sir,
Your most obedient servant,

Chief Electrical Engineer. 7/3

MH-CSC.

RL 7.3.47

Noted 7/3/47

G. R. S. App. F VI—G. 2]

SUBJECT Estimate for constructing a 110 K-V single circuit transmission from Bhadravathi to Bangalore.

5 Copies)

Diary No. of letter replied to .....

Section Elec I

File No. 207-45

Serial No. 27

General and Revenue Secretariat

( )

the 19 .

Proceedings of the Government of His Highness the Maharaja of Mysore.

Read:- G.O. No EDS 1082-85 dy 27/11/45 according administrative sanction ~~Read~~ to certain post war schemes at a total cost of Rs. 5/- crores.

2. Correspondence ending with letter No 25722 dated the 7th March 1947 from the C.E.E. submitting for sanction an estimate for Rs 95.65 (98.65) lakhs for the construction of a transmission line from Bhadravathi to Bangalore with necessary terminal equipments at Bangalore and Bhadravathi as well as for the necessary underground cables for connecting the new 50 cycle

Date of issue 22/7/ 1947.

Signed by Mr. A. Ramakrishna

May this be—

(i) printed?

(ii) treated as a standing order?

(iii) published in the Gazette, English Part?

(iv) translated?

v) placed at the disposal of the Press?

(vi) published in the Gazette, Kannada Part?

~~Order thereon.—No.~~

receiving station with the existing stations in Bangalore and requesting approval to :-

1) Carry out the works departmentally
2) entertain the necessary construction and maintenance establishments as provided in the estimate
3) the grant of Construction Allowance to the staff.
4) the purchase of the necessary materials required for the works through S.P.C.

Order No EDS 237-239/El 207-45-27

Dt. 24th July 1947

1. Govt are pleased to sanction a ~~reduced~~ modified estimate as appended to this order for Rs 95.50 lakhs. The other proposals of the C.E.E are also approved.

2. The transmission line from Bhadravati to Bangalore shall be constructed along the shortest route possible.

3. Works for which lumpsum provisions have been made shall be proceeded with only after detailed estimates pertaining thereto are sanctioned.

RR 21.7.47.

Secretary to Govt
Electrical Dept

To
17/7 for (17.7.47)

The C-in-C (with a copy of the estimate)
The Comptroller to Govt.
The Auditor, Elect. Dept (with a copy of the estimate)

List of Enclosures

Copied by

Examined by

PROCEEDINGS OF THE GOVERNMENT OF HIS HIGHNESS
THE MAHARAJA OF MYSORE.

Read:-

Govt. Order No.EDS.1082-85 dated 27th Novr.1945 according administrative sanction to certain Post-war schemes at a total cost of Rs.5 crores.

2. Correspondence ending with letter No.25722 dated the 7th March 1947 from the Chief Electrical Engineer submitting for sanction an estimate for Rs.93.65 lakhs for the construction of a transmission line from Bhadravati to Bangalore with necessary terminal equipments at Bangalore and Bhadravati as well as for the necessary underground cables for connecting the new 50 cycle receiving station with the existing stations in Bangalore and requesting approval to:-

1) carry out the work departmentally,

2) entertain the necessary construction and maitenance establishments as provided in the estimate,

3) the grant of construction allowance to the staff, and

4) the purchase of the necessary materials required for the work through Stores Purchase Committee.

Order No.E.D.S. 237-239. / El 207-45-24 Bangalore, 24th July, 1947.

1. Government are pleased to sanction a modified estimate for Rs.95.50 lakhs as appended to this order. The other proposals of the Chief Electrical Engineer are also approved.

2. The transmission line from Bhadravati to Bangalore shall be constructed along the shortest route possible.

3. Works for which lumpsum provisions have been made shall be proceeded with only after detailed estimates pertaining thereto are sanctioned.

By order R.R. 22.7.47.
Secretary to Government,
Electrical Department.

To

The Chief Electrical Engineer (with a copy of the estimate)
The Comptroller to Government.
The Auditor, Elecl. Dept. (with a copy of the estimate).

TDC.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

Abstract estimate for constructing a 110 KV.50 cycles, single circuit transmission line from Bhadravati to Bangalore and the terminal structures at Bhadravati and Bangalore and the New Station at Bangalore.

Sl. No.	Details of estimate.	Estimate No.	Estimate amount as corrected in this office.
			Rs
1.	160 Miles, 110 KV.3 Phase, 50 cycles transmission line from Bhadravati to Bangalore.	A	44,80,000
2.	160 miles Magneto Telephone line from Bhadravati to Bangalore.	B	5,63,000
3.	Surveying the transmission line route	C	24,210
4.	Out-door terminal structure and control gear at Bhadravati	D	1,75,200
5.	Out-door terminal structure, control gear, metalclad switchgear, transformers etc., at Bangalore.	E	15,84,420
6.	Four river crossing structures	F	25,200
7.	Six special structures for Hilly areas	G	28,700
8.	Six transposition structures	H	30.110
9.	Six sectionalising structures	I	58,600
10.	Three Railway guarding structures.	J	4,100
11.	Buildings for Receiving Station at Bangalore, quarters for Maintenance Staff at Bangalore Bhadravati and for transmission line staff and also for installation of a 50 ton crane at Bangalore.	K	8,48,500
12.	Construction Establishment with allowances.	L	69,786 ~~60,081~~
13.	Cost of interconnecting the new station with 'A', 'B' and 'C' stations with underground cables and converting existing 2.2 K.V. to 4.4 KV. distribution system	M	15,51,000
14.	Five protective equipments at the Bangalore Receiving Station (estimated)	N	80,000
15.	Travelling allowances etc.		8,000
16.	Medicines for temporary staff		2,000
17.	Contingencies and for rounding		17,174 ~~17,079~~
	T o t a l		Rs 95,50,000
	Annual cost of maintenance		Rs 71,991 ~~72,621~~/-

SANCTIONED BY GOVERNMENT FOR Rs. 95,50,000/- (RUPEES Ninety-five Lakhs and fifty thousand only) vide G.O.No. Elec.(1)-1947 dated 24-7-1947

R.P. 24/7/47 for Secretary to Government Electrical Department

R.P. 24/7/47.
Secretary to Government,
Electrical Department.

A.N.22nd

GOVERNMENT OF MYSORE. ESTIMATE "A" ELECTRICAL DEPARTMENT.

For constructing a 110 K.V., 50 Cycles, single circuit transmission line from Bhadravati to Bangalore. Distance 160 miles, 17 spans for miles cost per two miles.

Sl. No.	Names of materials etc.	Unit.	Quantity.	Rate. Rs	Amount. Rs
1.	Fabricated steel suspension structures including braces, grillage, crossarms, etc.	No.	15	1,210-0-0	18,150-0-0
2.	Do. strain structure inclusive as above	"	2	1,960-0-0	3,920-0-0
3.	Suspension insulators, 7 units for suspension and 8 units for strain including loop supports	"	459	9-0-0	4,131-0-0
4.	334,600 C.M. A.C.S.R. cable or equivalent copper.	mile	6	2,100-0-0	12,600-0-0
5.	Suspension clamps, with arcing horns, clevis fittings, etc.	set	51	22-0-0	1,122-0-0
6.	Overhead steel ground wire, 5/16" dia.	Mile	4	500-0-0	2,000-0-0
7.	Strain clamps with arcing horns, clevis fittings, etc.	Set	12	25-0-0	300-0-0
8.	Strain clamps for overhead ground wire	"	8	20-0-0	160-0-0
9.	Paint two coats for structures and cross-arms.	Str	17	25-0-0	425-0-0
10.	Guy sets complete erected	Sets.	35	75-0-0	2,625-0-0
11.	Provision for grounding the earth wire with a clamp for testing purposes.	No.	2	35-0-0	70-0-0
12.	Miscellaneous materials, such as bird guards, joints, ~~name~~ plates, etc.	L.S.			400-0-0
13.	Tools and Plant	L.S.			600-0-0
14.	Cement concrete footings erected (about 112 C.Ft.)	No.	36	100-0-0	3,600-0-0
15.	Labour charges for assembly and erection of structures including digging pits, painting etc.	No.	17	75-0-0	1,275-0-0
16.	Labour charges for stringing power and ground wires, fixing insulators, etc.	Mile.	10	60-0-0	600-0-0
17.	Jungle clearing for Transmission Line	L.S.			300-0-0
18.	Transportation charges	L.S.			600-0-0
19.	Stock Incidentalsat 6% on items 1-14				3,125-0-0
				Total Rs	56,003-0-0

Cost per mile Rs 28,000/-
Cost for 160 miles Rs 44,80,000/-

A.N.10th/5

24/7/40
Secretary to Government,
Electrical Department.

GOVERNMENT OF MYSORE. ESTIMATE "B" ELECTRICAL DEPARTMENT.

For constructing a double circuit magneto telephone line from Bhadravati to Bangalore, 160 miles (Cost per mile.)

Sl. No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
				Rs	Rs
1.	Ascu treated baliga pole 26'	No.	24	20-0-0	480-0-0
2.	4-pin crossarm with braces	"	26	6-0-0	156-0-0
3.	No.6 B & S. or 8 S.W.G.H.D.B.C. copper wire.	Mile	4	350-0-0	1,400-0-0
4.	8 K.V. pin insulators	No.	104	4-6-0	455-0-0
5.	Guy sets erected	"	6	45-0-0	270-0-0
6.	Miscellaneous materials such as binding wire, solder, paint etc.	L.S..			30-0-0
7.	Labour charges for erection of poles crossarms, braces, fixing insulators and stringing conductors.	Mile	1	220-0-0	220-0-0
8.	Jungle clearing	Mile	1	50-0-0	50-0-0
9.	Transportation charges	L.S.			50-0-0
10.	Stock incidentals at 25% on item 1 and at 6¼% on items 2 to 6				265-0-0
				Total Rs	3,376-0-0
	Total for 160 miles				Rs 5,40,160-0-0
11.	Wall Telephones with arresters, insulating transformers, D.P.S.T. switch teakwood board extension bell	No.	16	400-0-0	6,400-0-0
12.	Portable telephones with leads etc.	"	32	300-0-0	9,600-0-0
13.	Primary cutouts for sectionalising the line.	"	24	37-8-0	900-0-0
14.	River crossing structures with necessary 2 B & S. A.C.S.R. wire erected	Sets.	4	825-0-0	3,300-0-0
15.	Railway guarding structures etcted.	"	3	500-0-0	1,500-0-0
16.	Stock incidentals on items 10, 11, 12				1,056-0-0
				Total Rs	5,62,916-0-0

Or say Rs 5,63,000/-

RR. 24.7.47.

for Secretary to Government,
Electrical Department.

A.N.10th/5

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "C"

Estimate for surveying the route of the proposed transmission line between Bhadravati and Bangalore.

Sl. No.	Particulars.		Amount.
1.	Depreciation on Surveying Instruments.	L.S.	Rs 1,000-0-0
2.	Tools and Plant.		Rs 2,000-0-0
3.	Pay and allowances for two Transmission Line Inspectors at Rs 80-5-125 plus Rs 30/- Horse Allowance for 8 months.		
	Average salary	Rs 108/-	
	Horse Allowance	Rs 30/-	Rs 2,208-0-0
4.	Labour charges for clearing jungle etc., during surveys, demarcations, etc., at Rs 100/- per mile for 160 miles.		Rs 16,000-0-0
5.	Drawing instruments and Stationery		Rs 500-0-0
6.	Miscellaneous materials such as flags, Kerosene, etc.		Rs 1,500-0-0
7.	Transportaion charges for Camps, Survey materials, Tools, etc.		Rs 1,000-0-0
	T o t a l		Rs 24,208-0-0

or say Rs 24,210/-

A.N.10th/5

Sd/ R.R.
Secretary to Government,
Electrical Department.
24.7.47

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "D".

ESTIMATE FOR AN OUT-DOOR TERMINAL STRUCTURE AND CONTROL GEAR AT BHADRAVATI.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	Terminal stfucture erected, buses, insulators, platforms, enclosure, etc., as per detailed estimate "D" item 1.	No.	1	42600-0-0	42600-0-0
2.	Set of 110 KV. lightning arresters, 3-phase with isolators, etc., as per detailed estimate "D2 item 2.	No.	1	19300-0-0	19300-0-0
3.	Circuit breaker oil, triple pole with all operating mechanism complete with oil as per detailed estimate "D" item 3.	No.	1	74400-0-0	74400-0-0
4.	Control panel with meters, relays, etc., and two H.T. disconnecting switches for the line O.C.B. as per detailed estimate "D" item 4.	No.	1	23300-0-0	23300-0-0
5.	Control cables.			L. S.	3000-0-0
6.	Miscellaneous materials and unforeseen materials.				5000-0-0
7.	Erection charges for switchgear, arresters, panel, disconnecting switches, as per detailed estimate "D" item 5.			L. S.	5000-0-0
8.	Transportation charges.			L. S.	1000-0-0
9.	Tools & Plant.			"	1000-0-0
10.	Stock incidentals @ 6¼% on items 5,6 & 9.				563-0-0
				Total Rs.	175163-0-0

1176
22
1144
1000/-

Or Say Rs. 1,75,200/-

Sd/ K Mutthanna

KM-JS. —CHIEF ELECTRICAL ENGINEER.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "D" ITEM 1.

Detailed estimate for terminal structure busses, insulators, Platforms, enclosures, etc.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Steel materials consisting of stanchions, beems, inclusive of fabrication, painting, etc., for one bay as per details in Estimate "D" item 1.(i)	No.	1	24480-0-0	24480-0-0
2.	Reinforced cement concrete 1:2:4 for foundations of steel stanchions with granite jelly 1" to 1½" size including form work, laying tamping, etc.	Estimated.			5000-0-0
3.	Flooring for the platform with 6" thick cement concrete 1:2:4 & ½" thick cement plastering 1:3.	-do-			800-0-0
4.	Providing foundations for the O.C.B. with R.C. with granite jelly 1" to 1½" size including form work, bolt hole boxes laying tamping, etc., complete with light reinforcements of 3/8" dia. bars placed two ways and providing guard railing 3' height all-round.	-do-			1500-0-0
5.	Busses & insulator supports.	L. S.			5000-0-0
6.	Lighting for the Bay.	L. S.			800-0-0
7.	Earthing materials.	L. S.			2500-0-0
8.	Miscellaneous & unforeseen materials.	L. S.			2000-0-0
9.	Stock incidents @ 6⅛% on items 5 & 7.				470-0-0
				Total Rs.	42550-0-0

Or Say Rs. 42,600/-

(Sd) K. Matthan

KM-JS. Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "D"- ITEM 2.

DETAILED ESTIMATE FOR INSTALLATION OF LIGHTNING ARRESTERS.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	3-phase lightning arresters, thyrite type, 110 KV, for a grounded neutral system.	Set.	1	13500-0-0	13500-0-0
2.	Isolators for lightning arresters.	"	1	4000-0-0	4000-0-0
3.	Provision for the arrester foundations.			L. S.	680-0-0
4.	Stock incidentals @ 6¼% on items 1 & 2.				1090-0-0
	Or Say Rs. 19,300/-			Total Rs.	19270-0-0

KM-JS.

Chief Electrical Engineer.

Estimate 'D' item 3.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

DETAILED ESTIMATE FOR OIL CIRCUIT BREAKER WITH OPERATING MECHANISM, OIL, ETC.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	Oil circuit breaker triple pole with operating mechanism 110 KV, 3-phase 600 amps. 1500 M.V.A. including 2310 U.S. gallons of transil oil and bushing current transformers.	No.	1	70000-0-0	70000-0-0
2.	Stock incidentals @ 6¼%				4375-0-0
	Or Say Rs. 74,400/-			Total Rs.	74375-0-0

(Sd) K. Mathan

KM-JS.

CHIEF ELECTRICAL ENGINEER.

Estimate D...

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

Detailed estimate for control panel with meters, relays, etc., and 2 high tension disconnecting switches for the line oil circuit Breaker.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Control panel with meters, etc., to control the 110 KV, 50 cycles, Bhadravati-Bangalore transmission line complete indicating instruments, protective relays, etc., complete.	No.	1	10500-0-0	10500-0-0
2.	Triple pole, single throw, disconnecting isolators, group operated, 110 K.V.	Set.	2	4600-0-0	9200-0-0
3.	Triple pole earthing switch, 110 KV.	"	1	1840-0-0	1840-0-0
4.	Auxiliary switches.	No.	3	105-0-0	315-0-0
5.	Stock incidentals @ 6¼%.				1366-0-0
	Or Say Rs. 23,300/-			Total Rs.	23221-0-0

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "D"- ITEM 8.

DETAILED ESTIMATE FOR ERECTION OF ITEMS IN ESTIMATE "D"

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	One oil circuit breaker - 14 tons. Two T.P.S.T. switches. - 1 " Lightning arrester with isolators. - 1 " Instrumental transformers, buses, etc. - 4 " 20 "	Tons.	20	200-0-0	4000-0-0
2.	Installing & wiring one control panel complete for the 110 K.V. 50 cycles, line, etc.			L. S.	400-0-0
3.	Laying & jointing control cables.			L. S.	600-0-0
				Total Rs.	5000-0-0

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E"

Estimate for constructing an outdoor terminal structure and control gear at Bangalore.

Sl. No.	Names of materials etc.	Unit.	Quantity.	Rate.	Amount.
				Rs	Rs
1.	Terminal and transformer structure complete with buses, conductors, insulators, platforms, etc., as per detailed estimate "E" item 1.	No.	1	80,000-0-0	80,000-0-0
2.	110 K.V., 3 phase lightning arrester and isolators as per detailed estimate "E" item 2	Set	1	19,800-0-0	19,800-0-0
3.	Oil circuit breakers 110 KV. outdoor type with operating mechanism etc., complete as per detailed estimate "E" item 3.	No.	3	2x22	2,23,200-0-0
4.	Control panels for line transformer bank H.T. and L.T. complete. Detailed estimate "E" item 4.	No.	2		68,500-0-0
5.	Power transformers O.I.S.C. 15000 K.V.A. with O.L. tap changegear, etc. and also 250 K.V.A. station transformers. Detailed estimate"E" item 5.	No.	2		6,26,700-0-0
6.	Oil circuit breakers L.T.4.4 KV. Outdoor type with operating mechanism, oil complete detailed estimate "E" - item 6.	No.	2		1,81,600-0-0
7.	Cost of earthing both indoor and outdoor structures.	Estimated.			7,500-0-0
8.	One 60 cell 800 ampere-hour battery with battery chargers, etc., Detailed Estimate "E" - Item 7	Set.	1		34,000-0-0
9.	Metalclad switchgear for L.T. distribution with buses, A.C.S. isolators, panels, meters, relay, switches, etc., Estimate "E" item 8.	No.	17		3,45,300-0-0
10.	Miscellaneous materials such as insulated cables, control cables, bushings, etc.	Estimated			27,000-0-0
10(a)	Tools and Plant.	L.S.			20,000-0-0
11.	Erection charges as per estimate "E" item 9.				55,000-0-0
12.	Transportation charges	Estimated			9,000-0-0
13.	Stock incidentals at 6% on item 10 and 10(a)				2,320-0-0
		Total			Rs 15,84,420-0-0

JC RR
Secretary to Government,
Electrical Department.
24-7-40.

A.N.10th/6

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E" - ITEM 1.

Detailed estimate for terminal and transformer structure complete with busses, conductors, insulators, Platforms, etc.

Sl. No.	Names of materials etc.	Unit.	Quantity.	Rate.	Amount.
1.	Structure materials consisting of steel stanchions, beams, inclusive of fabrication, erection, painting, etc., for 2 bays as per detailed estimate "E" (a)/1	No.	2	24,480-0-0	48,960-0-0
2.	Reinforced cement concrete 1:2:4 for foundation of steel stanchions and beams with granite jelly 1" to 1½" size including form work, laying, tamping, etc., complete.		Estimated		10,000-0-0
3.	Providing foundations for the O.C.B's (one for the 110 K.V. line and one for the H.T. transformer bank) with R.C.C. 1:2:4 with granite jelly 1" to 1½" size including form work bolt hole boxes laying and tamping and providing guard railings, 3 Ft. high alround.		Estimated		3,000-0-0
4.	Flooring for the platform with 6" thick cement concrete 1:2:4 and ½" thich cement plastering 1:3.		L.S.		1,600-0-0
5.	Busses and Insulator supports		Estimated		10,000-0-0
6.	Lighting for the bays		"		2,000-0-0
7.	Miscellaneous and unforeseen materials		L.S.		3,000-0-0
8.	Stock incidentals at 6¼% on items 5 & 7				933-0-0
			Total		Rs 79,498-0-0

or say Rs 80,000/-.

O/C R.R. 24.7.44

for Secretary to Government,
Electrical Department.

A.N. 11th/5

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E" ITEM 2.

Detailed estimate for 110 K.V. 3-phase lightning arresters with isolators.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	3-phase thyrite lightning arresters 110 K.V. for grounded neutral systems.	Set.	1	11650-0-0	11650-0-0
2.	Isolators for lightning arresters.	Set.	1	3400-0-0	3400-0-0
3.	Provision for the arrester foundations.			L. S.	680-0-0
4.	Stock incidentals @ 6¼% on items 1 & 2.				940-0-0
	Rs. 16,670/-			Total Rs.	16670-0-0

KM-JS.

(Sd) Kumaraswamy
Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E" ITEM 3.

Detailed estimate for 2 oil circuit breakers, 110 K.V. out-door type complete with operating mechanism, oil, etc., for the control of one 110 K.V. Bhadravati-Bangalore 110 K.V. line and one for 15000 K.V.A. transformer Bank H. T. side.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	110 K.V. 3-phase, 600 amperes, 1500 M.V.A. out-door type, O.C.B. with operating mechanism, etc., including 4620 U.S. gallons oil transil & bushing current transformers.	No.	2	60000-0-0	120000-0-0
2.	Stock incidentals @ 6¼%				7500-0-0
	Rs. 1,27,500/-			Total Rs.	127500-0-0

KM-JS.

(Sd) K. Subbiah
Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "B"- ITEM 4.

Detailed estimate for the control panels with meters, relays, group operated isolators, etc., to control transmission line and 15000KVA transformer.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	Control panels for the control of 110 KV. transmission line, one 15000 K.V.A. 110/44 K.V. transformer complete with instruments, meters, relays, etc.	No.	3	10500-0-0	31500-0-0
2.	Triple pole single throw disconnecting isolators, 110 K.V.	"	6	4600-0-0	27600-0-0
3.	Triple pole earthing switch for transmission line, 110 K.V.	Set.	1	1840-0-0	1840-0-0
4.	Auxiliary switches.	No.	7	105-0-0	735-0-0
5.	Stock incidentals on item 1 to 4 @ 6½%.				3855-0-0 ~~3798-0-0~~
	or Say Rs. 65,500/-			Total Rs.	~~65473-0-0~~ 65530-0-0

(Sd) K. Mathkar

Chief Electrical Engineer.

KM-JS.

GOVERNMENT OF MYSORE.

ELECTRICAL DEPARTMENT.

ESTIMATE "E"- ITEM 5.

Detailed estimate for the power transformers self-cooled outdoor, 15000 K.V.A. 3-phase, 110/4.4 K.V. complete with on load tap changing gear and two 250 K.V. A. transformer 4400/220/110 for Station control.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Power transformer O.I.S.S.C. 15000 K.V.A. 110/4.4 K.V. 50 cycles, complete with on load tap changing gear and with first filling of oil.	No.	2	225000-0-0	450000-0-0
2.	Transformer, 3-phase, 250 K.V.A. 4.4 KV/110-V. 50 cycles with oil.	"	2	15000-0-0	30000-0-0
3.	Foundations for the transformers with R.C.C. 1:2:4 & granite jelly 1" to 1½" size including form work, tamping, etc. complete.			Estimated.	4500-0-0
4.	Miscellaneous materials including oil, piping, etc., complete.			L. S.	8000-0-0
5.	One transformer truck.	No.	1	3500-0-0	3500-0-0
6.	Stock incidentals on all items except item 3 @ 6¼%				30720-0-0
	Or Say Rs. 5,26,700/-			Total Rs.	526720-0-0

KM-JS.

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E"- ITEM 6.

Revised estimate for oil circuit breaker 4.4 K.V. complete with operating mechanism and oil for the control of L. T. side of 16000 K.V.A. transformer banks.

Sl No.	Names of materials.	Unit.	Quantity.	Rate.	Amount.
1.	4.4 K.V. L.T. oil circuit breaker 4000 amps. 3-phase, 50 cycles, and breaking capacity of 250 M.V.A. with 2 sets of gang operated triple pole 4000 amp. insulators in sheet steel cubicle with current and voltage - transformers, cable sealing ends, etc., and inclining emergency hand operator and tank lowering device, etc.,	No.	2	85000-0-0	170000-0-0
2.	Oil transil.	U.S.Gallons.	340	2-10-0	850-0-0
3.	Stock incidentals @ 6% on items 1 & 2.				10385-0-0
				Total Rs.	181235-0-0

Or say Rs. 1,81,230/-

(Sd) K. Mathan

Chief Secretary to Engineer.

KV-RS-JR.

GOVERNMENT OF MYSORE ELECTRICAL DEPARTMENT

ESTIMATE 'E' Item 7

Detailed estimate for the 60 cell 800 ampere hour battery set, Battery chargers, panels, etc.

Sl. No.	Names of materials, etc.	Unit.	Qty.	Rate. Rs. As.	Amount Rs.
1.	60 Cell, 800 amp. hour battery with 2 battery charging setx, panels, etc.	Set	1	31000 0	31000/-
2.	Acid for battery			L.S.	1000/-
3.	Stock incidentals at 6¼%				2000/-
			Total:		Rs.34000/-

Sd/- K.Matthan
for Chief Elecl. Engineer

GOVERNMENT OF MYSORE ELECTRICAL DEPARTMENT.

ESTIMATE 'D' ITEM 1(i)

Sl. No.	Names of materials, etc.	Unit.	Quantity	Rate Rs.	Amount Rs.
1.	Fabricated steel materials consisting of stanchions beams, etc. complete for one day	Ton	32	560.	17,920.
2.	Erection of structures	"	32	150.	4,800.
3.	Painting the structures after erecting with read lead and aluminium paint	"	32	20.	640.
4.	S.I. at 6¼% on item 1				1,120.
			Total:		Rs 24,480.

Sd/- K.Matthan
for Chief Elecl.Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E" ITEM 8.

Detailed estimate for metalclad switchgear for L.T. distribution with buses, air circuit breakers, etc., including meters, instruments, - relays disconnects, etc.,

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Metalclad switchgear with steel panels, mounted and completely wired with instruments, relays, switches, etc., complete including air circuit breakers, etc. (11 panels for 50 cycles & 9 panels for 25 cycles.)	No.	~~20~~ 17	Estimated.	325000-0-0
2.	Stock incidentals @ 6¼%.				20300-0-0
				Total Rs.	345300-0-0

Or Say Rs. 3,45,300/-

Sd) K. Markham

KM-JS. Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "E" ITEM 9.

Detailed estimate for the cost of erection of the H.T. and L.T. Switchgear.

Sl. No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
				Rs	Rs
1.	Erection of 2/15000 K.V.A. and 250 K.V.A. transformers.	Ton	100	200-0-0	20,000-0-0
2.	Transformer drying, testing and servicing	No.	2	2,000-0-0	4,000-0-0
3.	Erection of switchgear, H.T and L.T. and metal clad, lightning arresters, isolators, disconnected switches, etc.	Ton.	70	200-0-0	14,000-0-0
4.	Labour for laying, jointing of power and control cables.		Estimated		15,000-0-0
				Total	Rs 53,000-0-0

A.N.11th/5

Secretary to Government,
Electrical Department.
24.7.47.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "F".

ESTIMATE FOR FOUR RIVER CROSSING STRUCTURES.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Built up structures as per Drg. No. 221 B. (Wt of single pole= 815 lbs)	No.	4	404-0-0	1616-0-0
2.	Angle iron 3½" x3½" x 5/16"	Ton.	0.194	309-8-0	60-0-0
3.	Angle iron 3" x 3" x 5/16"	"	0.93	309-8-0	288-0-0
4.	Angle iron 2" x 2" x ¼"	"	0.139	323-4-0	45-0-0
5.	Angle iron 1½" x 1½" x ¼"	"	0.25	328-4-0	82-0-0
6.	Gusset plates, 18" x 18" x ¼"	CWT.	1.232	25-0-0	31-0-0
7.	Bolts & nuts of sizes.	"	0.848	80-0-0	68-0-0
8.	Suspension insulators.	No.	88	9-0-0	792-0-0
9.	Bird guards with bolts & nuts conplete.	"	9	3-0-0	27-0-0
10.	Hooks, suspension clamps, arcing horns, clevis fittings, etc.	Set.	3	22-0-0	66-0-0
11.	Strain clamps with arcing horns, clevis fittings.	"	8	25-0-0	200-0-0
12.	Strain clamps for ground wire.	No.	2	20-0-0	40-0-0
13.	Guy sets erected.	"	4	75-0-0	300-0-0
14.	Cement concrete footings.	"	4	100-0-0	400-0-0
15.	Miscellaneous materials.			L. S.	250-0-0
16.	Fabrication charges.			L. S.	600-0-0
17.	Labour charges for erection of structures.			L. S.	300-0-0
18.	Transportation charges.			L. S.	800-0-0
19.	Stock incidentals @ 6¼% on items 1 to 15.				329-0-0
				Total cost per structure. Rs.	6294-0-0

Cost per structure = Rs. 6,294/-

Cost for 4 structures= Rs.25,176/- Or Say Rs. 25,200/-

KM-JS.

(Sd) K. Mathan

for Chief Electrical Engineer.

GOVERNMENT OF MYSORE — ELECTRICAL DEPARTMENT.

ESTIMATE "G"

ESTIMATE FOR SPECIAL STRUCTURES FOR HILLY AREAS -6 - DRG. T. 279.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	Built up poles.	No.	3	700-0-0	2100-0-0
2.	Angle iron for power cross-arm and braces 3" x 3" x 5/16"	Ton.	0.486	309-8-0	151-0-0
3.	Angle iron for ground wire cross-arms & for supporting ground wire 2" x 2" x ¼".	"	0.0475	323-4-0	15-8-0
4.	Gusset plates 18" x 18" ¼"	CWT.	0.41	25-0-0	10-8-0
5.	Flat iron braces for power cross-arms, curve plates, etc.	Ton.	0.033	265-0-0	9-0-0
6.	Bolts & nuts of sizes.	CWT.	0.36	80-0-0	29-0-0
7.	Suspension insulators.	No.	72	9-0-0	648-0-0
8.	Bird guards, bolts & nuts complete.			L. S.	20-0-0
9.	Suspension clamps, arcing horns, clevis fittings, etc.	No.	3	22-0-0	66-0-0
10.	Strain clamps. arcing horns, clevis fittings, etc.	No.	6	25-0-0	150-0-0
11.	Strain clamps for ground wire.	"	4	20-0-0	80-0-0
12.	Guy sets erected.	"	2	75-0-0	150-0-0
13.	Cement concrete footings.	"	3	100-0-0	300-0-0
14.	Miscellaneous materials, such as painting, etc.			L. S.	200-0-0
15.	Fabrication charges.			L. S.	150-0-0
16.	Labour charges for erection of structures.			L. S.	150-0-0
17.	Transportation charges.			L. S.	300-0-0
18.	Stock incidentals @ 6¼% on items 1 to 14.				246-0-0
				Total Rs.	4774-0-0

Total for one structure = Rs. 4,774/-

Total for 6 structures = Rs. 28,644/- or Say Rs. 28,700/-

KM-JS.

Sd/ K. Mathan

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "H"

ESTIMATE FOR 6 TRANSPOSITION STRUCTURES - DRG-T.275.

Sl. No.	Names of materials, etc.	Unit.	Quantity.	R a t e.	Amount.
1.	Fabricated steel strain structures including braces, crossarms, grillage, etc.	No.	1	1,960-0-0	1,960-0-0
2.	45' ascu treated baliga poles	"	2	80-0-0	160-0-0
3.	Suspension insulators	"	88	9-0-0	792-0-0
4.	Suspension clamps, arcing horns with clevis fittings, etc.	Set	3	22-0-0	66-0-0
5.	Strain clamps, arcing horns with clevis fittings.	Set	8	25-0-0	200-0-0
6.	Strain clamps for ground wire	No.	4	20-0-0	80-0-0
7.	Bird guards with bolts and nuts etc.	"	3	3-0-0	9-0-0
8.	Guy sets erected	Set	4	75-0-0	300-0-0
9.	Miscellaneous materials, paint, grounding materials, etc.	L.S.			350-0-0
10.	Cement concrete footings for structures	No.	3	100-0-0	300-0-0
11.	Labour charges for erection of structures	L.S.			300-0-0
12.	Transportation charges	L.S.			200-0-0
13.	Stock incidentals at 6¼% on items 1,3-11 and at 25% on item 2.				301-0-0
			Total	Rs	5,018-0-0

Total for one structure - Rs 5,018/-

Total for six structures -Rs 30,108/- or say Rs 30,110/-

O/c RR 24.7.47

Secretary to Government,
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A.N.11th/5

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "I"

Estimate for sectionalising structure.

Sl. No.	Names of materials etc.	Unit.	Quantity.	Rate.	Amount.
1.	Fabricated steel strain structure with crossarms, braces, grillage, etc.	No.	1	1,960-0-0	1,960-0-0
2.	26' ascu treated baliga poles	No.	8	20-0-0	160-0-0
3.	I Section with bolts, etc., for supporting the sectionalising switches	Ton	0.305	320-0-0	215-0-0
4.	Group operated, 3-phase, sectionalising switches with operating mechanism complete.	No.	1	3,228-0-0	3,228-0-0
5.	Pedestal insulators 110 K.V.	"	8	35-0-0	280-0-0
6.	Suspension insulators	"	72	9-0-0	648-0-0
7.	Suspension clamps with arcing horns, clevis fittings, etc.	"	3	22-0-0	66-0-0
8.	Strain clamps with arcing horns clevis fittings etc.	"	6	25-0-0	150-0-0
9.	Strain clamps for overhead ground wire.	"	4	20-0-0	80-0-0
10.	Guy sets complete erected	Set	2	75-0-0	150-0-0
11.	Miscellaneous materials such as birdguards, joints, 2 coats paint etc.	L.S.			400-0-0
12.	Cement concrete fottings for steel structure	No.	3	100-0-0	300-0-0
13.	Labour charges for erection of structure, painting etc.	L.S.			800-0-0
14.	Transportation charges	L.S.			800-0-0
15.	Stock incidentals at 25% on baliga poles, and 6¼% on items 1 and 3-13				527-0-0
			Total		Rs 9,764-0-0

Cost per structure - Rs 9,764/-

Cost for 6 structures- Rs 58,584/- or say Rs 58,600/-.

O/c R.R. 24.7.47

& Secretary to Government,
Electrical Department.

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ESTIMATE "J"

ESTIMATE FOR RAILWAY GUARDING STRUCTURE- DRG. NO.

Sl No.	Names of materials, etc.	Unit.	Quantity.	Rate.	Amount.
1.	S. M. Rail, 41¼ lb. - 30 Ft. long.	No.	6	45-0-0	270-0-0
2.	Crossarms angle iron 3½ x 3½ x 3/8	Ton.	0.336	309-8-0	104-0-0
3.	Fish plates angle iron 4"x4"x 3/8'		Estimated.		4-0-0
4.	Brace flat iron 2" x ¼".	CWT.	0.18	13-4-0	2-8-0
5.	Bolts & nuts.	"	0.366	80-0-0	30-0-0
6.	Wire copper & plate, etc. for grounding.		Estimated.		87-0-0
7.	8 B.W.G. galvd. wire for netting.	CWT.	0.447	32-8-0	14-8-0
8.	Guy sets complete erected.	No.	10	45-0-0	450-0-0
9.	Concrete footings for rails.	No.	6	20-0-0	120-0-0
10.	Miscellaneous materials.		Estimated.		20-0-0
11.	Labour charges.		L. S.		100-0-0
12.	Transportation charges.		L. S.		100-0-0
13.	Stock incidentals @ 6¼% on items 1 to 10.				69-0-0
				Total Rs.	1371-0-0

Cost per structure = Rs. 1371-0-0

Cost of 3 structures. = Rs. 5100-0-0

KM-JS.

(Sd) K. Mallikarjuna

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K"

Sl. No.	Particulars.	Amount.
1.	Receiving Station building at Bangalore to house metalclad switchgear, frequency converter, etc., complete with Lighting, drainage, water supply, land, etc. (Estimated)	Rs 3,00,000-0-0
2.	1-50 Ton travelling crane for the Bangalore Receiving Station complete as per Estimate "K" Item 1.	Rs 96,000-0-0
3.	Erection charges for crane, crane track, weight approximate 40 tons at Rs 150/- per ton.	Rs 6,000-0-0
4.	Quarters for Maintenance Staff at Bhadravati - Bangalore including amenities, lighting, water supply, drainage, etc. Estimate "K" item 2.	Rs 2,21,000-0-0
5.	Quarters for Transmission Line Staff including lighting, Water Supply drainage, etc. Estimate "K" Item 3	Rs 2,25,500-0-0
	Total	Rs 8,48,500-0-0

A.N. 11th/5

O/c RK 24.7.47
Secretary to Government,
Electrical Department.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K" ITEM 1.

DETAILED ESTIMATE FOR A 50 TON CRANE IN THE RECEIVING STATION, BANGALORE.

Sl No.	Names of materials, etc.,	Unit.	Quantity.	Rate.	Amount.
1.	50 Ton electric ~~operated~~ overhead crane complete with all gearing, motors, tools, panels, etc., with track wiring, wires, stretching screws, insulator supports, etc.	Set.	1	86000-0-0	86000-0-0
2.	3-conductor cable, etc., required for arranging power supply to 50 ton crane.			Estimated.	2000-0-0
3.	Miscellaneous & unforeseen materials including sheet steel, etc., for Crane, platforms, etc.			Estimated.	2350-0-0
4.	Stock incidentals @ 6¼%.				5650-0-0
				Total Rs.	96000-0-0

Total Rs. 96,000/-

KM-JS.

(Col) K. Mallaya
Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K" - ITEM 2.

Quarters for Maintenance staff at Bangalore.

Sl. No.	Particulars.	Drawing Number.	No.	Amount in rupees.
At Bangalore.				
(a)	Assistant Superintendent	J.P.S. "B" Type	1	13,000-0-0
(b)	Junior Engineer	J.P.S. "B" Type	1	13,000-0-0
(c)	Operators	J.P.S. "C" Type	4	36,000-0-0
(d)	Assistant Operators and Cable Inspector	Type "G" 379	5	35,000-0-0
(e)	Mechanics and Cable Jointer	"G" 473	4	14,000-0-0
(f)	Station Helpers and Linemen	"G" 445 & "G" 449	42	70,000-0-0
(g)	Lighting, Water Supply, Drainage, Fencing, Acquisition and amenities			40,000-0-0
		Total		Rs 2,21,000-0-0

A.E. 11th/5

O/c RK. 24.7.47.

By Secretary to Government,
Electrical Department.

GOVERNMENT OF MYSORE. ELECTRICAL DEPARTMENT.

ESTIMATE "K" - ITEM 3.

Quarters for Transmission Line Staff.

Sl. No.	Particulars.	Drawing Number.	No.	Amount in rupees.
1.	**BHADRAVATI.**			
	(a) Transmission Line Inspector	G.379	1	7,000-0-0
	(b) Linemen and Labourers	S.N.P.33	4	6,500-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			2,500-0-0
2.	**TARIKERE.**			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Line men	G.445	5	8,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition etc.			3,000-0-0
3.	**B I R U R.**			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Linemen	G.449	6	10,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition etc.			3,500-0-0
4.	**MATHIGATTA.**			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Linemen	G.445	5	8,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			3,000-0-0
5.	**ARSIKERE.**			
	(a) Transmission Line Inspector	G.379	1	7,000-0-0
	(b) Linemen	G.449	6	10,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			3,500-0-0
6.	**T I P T U R.**			
	(a) Assistant Superintendent of Lines.	J.P.S. "B" Type	1	13,000-0-0
	(b) Line Mechanics and Lorry Driver	G.473	2	7,000-0-0
	(c) Linemen and Lorry Cleaner	G.449	6	10,000-0-0
	(d) Lorry shed		1	3,000-0-0
	(e) Lighting, Water Supply, drainage, fencing, acquisition, etc.			4,000-0-0
7.	**TURUVEKERE.**			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Linemen	G.445	5	8,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			3,000-0-0
8.	**DODERI.**			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Linemen	G.445	5	8,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			3,000-0-0

RR. 24.7.43

ESTIMATE "K" ITEM 3 (CONTINUED)

Sl. No.	Particulars.	Drawing number.	No.	Amount in rupees.
9.	KUNIGAL.			
	(a) Transmission Line Inspector	G.379	1	7,000-0-0
	(b) Linemen	G.449	6	10,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			3,500-0-0
10.	MAGADI.			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Linemen	G.445	5	8,000-0-0
	(c) Lighting, water supply, drainage fencing, acquisition, etc.			3,000-0-0
11.	THIPPAGONDANAHALLI.			
	(a) Linemen		3	5,000-0-0
	(b) Lighting, water supply, drainage, fencing, acquisition, etc.			2,000-0-0
12.	TAVARAKERE			
	(a) Line Mechanic	G.473	1	3,500-0-0
	(b) Linemen	G.445	5	6,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition etc.			3,000-0-0
13.	BANGALORE.			
	(a) Transmission Line Inspector	G.379	1	7,000-0-0
	(b) Linemen	G.449	6	10,000-0-0
	(c) Lighting, water supply, drainage, fencing, acquisition, etc.			3,500-0-0
		Total		2,25,500-0-0

O/c Rd. 24.7.47

Secretary to Government,
Electrical Department.

A.E.11th/5

ESTIMATE "L"

Estimate for construction establishment with 10% Construction Allowance.

Sl. No.	Particulars.	No.	Average pay.	10% Con. Allowance.	Period Months.	Amount
1.	Assistant Superintendent of Lines on Rs 200-20-300 plus H.A. Rs 50/-	1	266 2/3 plus 50		18	5,700-0-0
2.	Transmission Line Inspectors on Rs 125-10-175 plus H.A. Rs 50/-	4	158 1/3 plus 50	16/-	18	16,152-0-0
3.	Store Keepers II Class at Birur Tiptur and Kunigal.	3	50/-		18	2,700-0-0
4.	Accounts Clerk on Rs 40-3-70-5-100	3	74/-		21	4,662-0-0
5.	Typist on Rs 30-3-45	2	41¼		18	1,485-0-0
6.	Miscellaneous Clerks Rs 30-3-45	6	41¼		18	4,455-0-0 ~~4,455-0-0~~
7.	Time Keepers on Rs 30-3-45	3	41¼		18	2,227-8-0 ~~2,227-8-0~~
8.	Peon on Rs 11/-	3	11		18	594-0-0
			Total ...		Rs	~~38,070-8-0~~ 37,975-8-0
	Assistant Superintendent at Bangalore on Rs 200-20-300 plus C.A.Rs75/-	1	266 2/3 plus 75/-		18	6,150-0-0
2.	Foreman on Rs 200-20-300	1	266 2/3		18	4,800-0-0
3.	Operators on Rs 125-10-175	2	158 1/3		18	5,700-0-0
3(a)	Line Inspector on Rs 80-5-125 plus C.A.Rs 7/8/-	2	108/- plus Rs 7-8-0		18	4,158-0-0
4.	Assistant Operators on Rs 35-5/2-80	2	62		18	2,232-0-0
5.	Accounts Clerk on Rs 40-3-70-5-100	3	74		21	4,662-0-0
6.	Typist on Rs 30-3-45	2	41¼		18	1,485-0-0
7.	Miscellaneous Clerk on Rs 30-3-45	2	41¼		18	1,485-0-0
8.	Time Keepers on 30-3-45	1	41¼		18	742-8-0
9.	Peons on Rs 11/-	2	11/-		18	396-0-0
				Total		31,810-8-0
	Total cost of Construction Establishment				Rs	~~69,881~~/- 69,786/-

...N.23rd.

Me R.R. 24.7.47.
Secretary to Government,
Electrical Department.

VERNMENT OF MYSORE. ESTIMATE "M" ELECTRICAL

Cost of interconnecting the New Station ith "A" "B" & underground cables and converting the existing 2.2K.V.

Sl No.	Particulars.	Unit.	Quantity.	Rate.	Amount.
	STAGE I.				
	New Station to "A" Station.				
1.	Cost of trencing (3 cables in trench 2 mls x 3' x 3') and refilling with earth plus repairs and compensation to Municipality, etc., for cutting of Tar roads, etc.	C.Yd.	3520	1-4-0	4400-0-0
2.	Cost of sanding, assuming 6" of sand all round cables.	"	1320	6-0-0	7920-0-0
3.	Labour for laying 6 miles of cable making joints, connecting cables to terminal boxes, etc.	Ft.	6 mls.	0-8-0	15840-0-0
4.	Cable underground 500 M.C.M. 5000 V.grade varnish cambric insulated lead covered, double steel tape armoured jute served & compounded overall.	Mls.	6	51000-0-0	306000-0-0
5.	Straight joint boxes suitable for 500Ø M.C.M. cable of item 4.	No.	60	150-0-0	9000-0-0
6.	Miscellaneous materials for cable laying such as galvanised and stone ware pipes, paper sleeves, pbtheads. bitumen, solder, etc.		Estimated.		30000-0-0
7.	Transportation charges.	Ton.	200	50-0-0	10000-0-0
8.	Stock incidentals @ 6¼% on items 4,5 & 6.				21600-0-0
	Or Say Rs. 405000/-			Total Rs.	404760-0-0
	From "A" Station to Ringwood Circle.				
1.	Cost of trenching (2 cables in trench 1 mile x 2' x 3') and refilling with earth plus repairs and compensation to Municipality, etc., for cutting of Tar Roads, etc.	C.Yd.	1173	1-4-0	1470-0-0
2.	Cost of sanding assuming 6" of sand all round the cables.	C.Yd.	440	6-0-0	2640-0-0
3.	Labor for laying 2 miles of cable making joints & connecting the cables to terminal boxes, etc.	Ft.	2 mls.	0-8-0	5280-0-0
4.	Cable underground 500,000 C.M. 5000V-grade varnish cambric insulated lead covered, double steel tape armoured, jute served & compounded overall.	Mile.	2	51000-0-0	102000-0-0
5.	Straight joint boxes suitable for 500 M.C.M. cable of item 4.	No.	20	~~140-0-0~~ 20-0-0	2800-0-0
6.	Miscellaneous materials for cable laying such as galvd. & stone ware pipes, paper sleeves, potheads, bitumen, solder, etc.		Estimated.		15000-0-0
7.	Transportation charges.	Tons.	50	50-0-0	2500-0-0
8.	Stock incidentals @ 6¼% on items 4,& 5, 6.				7500-0-0
	Or Say Rs. 1,39,000			Total Rs.	139190-0-0

(Sd) K. Mathan

Chief Electrical Engineer.

GOVERNMENT OF MYSORE. ESTIMATE "M" (CONTD) ELECTRICAL DEPARTMENT

Sl No.	Particulars.	Unit.	Quantity.	Rate.	Amt
	C.(I) From Ringwood Circle to "B" Station.				
1.	Cost of trenching (1 cable in trench 1.6 mile x 1' x 3') & refilling with earth plus repairs & compensation to Municipality, etc., for cutting of Tar roads, etc.	C.Yd.	938-2/3	1-4-0	117
2.	Cost of sanding, assuming 6" of sand all round cables.	C.Yd.	363-1/3	6-0-0	2176
3.	Labour for laying 1.6 miles of cable making joints & connecting cables to terminal boxes, etc.	Ft.	1.6 mls.	0-8-0	4220-
4.	Cable underground 500 M.C.M. 5000-v grade varnish cambric insulated, lead covered double steel tape armoured, jute served & compounded overall.	Mile.	1.6	51000-0-0	81600-0
5.	Straight joint boxes suitable for 500 M.C.M. cable of item 4.	No.	16	140-0-0	2240-0-
6.	Miscellaneous materials for cable laying such as galvd & stoneware pipes, paper sleeves, potheads, bitumen, solder, etc.	Ton.	40	Estimated.	12000-0-
7.	Transportation charges.			50-0-0	2000-0-
	Stock incidentals @ 6¼% on items 4,5 & 6.				5990-0-0
	Or Say Rs. 1,12,000/-			Total Rs.	111390-0-0
	(II) From Ringwood Circle to "C" Station.				
1.	Cost of trenching (1 cable in trench 1.2 mile x1' x3') & refilling with earth plus repairs & compensation to Municipality, etc., for cutting of Tar roads.	C.Yds.	704	1-4-0	880-0-0
2.	Cost of sanding assuming 6" of sand all round cables.	C.Yds.	266-2/3	6-0-0	1600-0-0
3.	Labour for laying 1.2 miles of cable making joints, connecting cables to terminal boxes, etc.	Ft.	1.2 mls.	0-8-0	3170-0-0
4.	Cable underground 500 M.C.M. 5000-v grade varnish cambric insulated. lead covered, double steel tape armoured, jute served & compounded overall.	Mile.	1.2	51000-0-0	61200-0-0
5.	Straight joint boxes suitable for 0 M.C.M. cable of item 4.	No.	12	140-0-0	1680-0-0
6.	cellaneous materials for cable ng such as galvd & stoneware pes, paper sleeves, potheads, itumen, solder, etc.	Ton.	40	Estimated.	
7.	ansportation charges.			50-0-0	9000-0-0
	ock incidentals @ 6¼% on items 5 & 6.				2000-0-0
	Or Say Rs. 84,000/-				4490-0-0
				Total Rs.	84020-0-0

Sd/ K. Mallaiah
Chief Electrical Engineer